*Cl* **FM** *SC* **Front Matter** *P* **13** *L* **12** # 447

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

The clause # is not included.

*SuggestedRemedy*

Make it Clause 168.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **00** *SC* **0** *P* **0** *L* **0** # 63

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) PICS (CG)*

The PICS subclauses may not be in alignment with the specification in each clause. Grant editorial license to update as needed.

*SuggestedRemedy*

With editorial license, update the PICS subclause in each clause/annex as necessary to align with specifications within the clause/annex.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Note that comment #376 proposes to reduce the content in the PICS subclauses.
For any clauses with a PICS subclause, implement the suggested remedy with consideration of the adopted response to comment #376 with editorial license.
[Editor's note: CC: many clauses]

*Cl* **00** *SC* **0** *P* **8** *L* **34** # 67

Lusted, Kent — Synopsys

*Comment Type* **E** *Comment Status* **A** *(bucket) (CG)*

Missing the list of members in the balloting committee

*SuggestedRemedy*

Add the list of members in the balloting committee

*Response* *Response Status* **C**

ACCEPT.

*Cl* **1** *SC* **1.1.3.2** *P* **54** *L* **17** # 371

Ran, Adee — Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (CG)*

"The 1.6TMII is a logical interconnection intended for use as an intra-chip interface"
To me "interface" is formal and "interconnection" is practical/implementation.

(Other items that include this statement can be handled in maintenance)

*SuggestedRemedy*

Change to
"The 1.6TMII is a logical interface intended for intra-chip interconnection".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **1** *SC* **1.2.3** *P* **54** *L* **28** # 281

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

Since this amendment is introducing "1.6TBASE-R", clause 1.2.3 needs to be updated to include "T" meaning Tb/s.

*SuggestedRemedy*

Change the first sentence of the last paragraph of 1.2.3 from
The data rate, if only a number, is in Mb/s, and if suffixed by a "G", is in Gb/s.
To
The data rate, if only a number, is in Mb/s, if suffixed by a "G", is in Gb/s, and if suffixed by a "T", is in Tb/s.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **1** *SC* **1.3** *P* **54** *L* **44** # 361

Kocsis, Sam — Amphenol

*Comment Type* **ER** *Comment Status* **A** *(bucket) (CG)*

Reference to OSFP is Revision 5.1, September 12, 2024 is outdated

*SuggestedRemedy*

Update reference to Revision 5.22, August 9, 2025

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **1** *SC* **1.3** *P* **54** *L* **51** # 362

Kocsis, Sam — Amphenol

*Comment Type* **E** *Comment Status* **A** *(bucket) (CG)*

The reference to REF-TA-1011 is normative, but the document iteself is informative. There are no direct references to REF-TA-1011 in 802.3dj, and any of the relevant information would be covered in SFF-8665 or SFF-TA-1027, or 1031.

*SuggestedRemedy*

Remove the reference to "REF-TA-1011 Rev 1.1.7, July 11, 2025, Cross Reference to Select SFF Connectors and Modules."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **1** *SC* **1.4** *P* **59** *L* **19** # 68

Lusted, Kent — Synopsys

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

In the base specification IEEE Std. 802.3-2022 page 204, the definition of "Channel Operating Margin (COM)" points to Clause 93A.1). There needs to be a reference to the COM in Annex 178A

*SuggestedRemedy*

Bring 1.4.237 Channel Operating Margin (COM): into the draft and add a reference to Annex 178A

*Response* *Response Status* **C**

ACCEPT.

*Cl* **1** *SC* **1.4.24aa** *P* **55** *L* # 54

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CG)*

1.4.24aa is not the correct subclause number. Instead it should be immediately before 1.4.101a "200GBASE-CR2" as inserted by IEEE Std 802.3ck-2022.

*SuggestedRemedy*

Change the subclause number per comment with editorial license.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **1** *SC* **1.5** *P* **59** *L* **50** # 69

Lusted, Kent — Synopsys

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

SCMR is used 12 times throughout the draft as an abbreviation for Signal to AC common-mode noise ratio. It is not listed in the abbreviations in Cl 1.5

*SuggestedRemedy*

Add abbrevation for SCMR as follows:
SCMR Signal to AC common-mode noise ratio

*Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.5.1.1.2** *P* **64** *L* **48** # 490

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

Need to add new speeds into the Behavior description.

*SuggestedRemedy*

Add 800GBASE-R and 1.6.TBASE-R to the laundry list of enumerations used when PMD type is unkown in the last paragraph of BEHAVIOR DEFINED AS: for aMAUType

*Response* *Response Status* **W**

ACCEPT.

*Cl* **30** *SC* **30.5.1.1.4** *P* **64** *L* **0** # 460

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

The data rates 800G & 1.6T needs to be added to the behavior.

*SuggestedRemedy*

Add 800Gb/s and 1.6Tb/s to the seventh paragraph for the behavior of aMediaAvailable.

*Response* *Response Status* **W**

ACCEPT.

*Cl* **30** *SC* **30.5.1.1.12** *P* **64** *L* **0** # 461

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

The data rates 800G & 1.6T needs to be added to the behavior.

*SuggestedRemedy*

Add 800Gb/s and 1.6Tb/s to the behavior of aLaneMapping

*Response* *Response Status* **W**

ACCEPT.

---

*Cl* **30** *SC* **30.5.1.1.17** *P* **64** *L* **0** # 462

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

The data rates 800G & 1.6T needs to be added to the behavior. Also to 30.5.1.1.18

*SuggestedRemedy*

Add 800Gb/s and 1.6Tb/s to the behavior of aFECCorrectedBlocks and aFECUncorrectedBlocks

In the SYNTAX sections the increment rate for 800Gb/s would be 160 000 000 and 320 000 000 for 1.6T/s
In the BEHAVIOR sections add 800 to list of xxxGBASE-R PHYs and in 1.6TBASER PHYs to the list as well.

*Response* *Response Status* **W**

ACCEPT.

---

*Cl* **30** *SC* **30.6.1.1.7** *P* **65** *L* **0** # 489

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

Clause 73 uses more than just the base page to indicate which technologies are available.

*SuggestedRemedy*

aAutoNegReceivedTechnologyAbility behavior needs to update this sentence:
For Clause 73 Auto-Negotiation, this attribute maps to bits D10-D13 and D21-D47 of the last received link codeword Base Page (see 73.6).

To:

For Clause 73 Auto-Negotiation, this attribute maps to bits of the last received link codeword Base Page and/or Message code 2 Next Page (see 73.6).

*Response* *Response Status* **W**

ACCEPT.

---

*Cl* **31B** *SC* **31B.3.7** *P* **693** *L* **17** # 250

de Koos, Andras — Microchip Technology

*Comment Type* **TR** *Comment Status* **R** *PHY delay (L)*

The maximum pause reaction times listed in this section for 200GBASE-R, 400GBASE-R, 800GBASE-R and 1.6TBASE-R correspond to the sum of the MAC+RS delay, PCS delay, BM-PMA delay, and PMD delay listed in the rate introductory sections. For example see Table 116-6 for 200Gbps. 453 = 96+313+36+8 (pause quanta).

However, the max pause reaction times for 200GBASE-R, 400GBASE-R, 800GBASE-R and 1.6TBASE-R are clearly underestimating the maximum delay, for two main reasons:
1. The values to not account for the possible presence of an MII-Extender, which adds an extra 2 PCS delays and 2 PMA delays to the latency through the physical layer. (So the numbers were erroneous even before 802.3dj!)
2. The possible presence of SM-PMA and Inner-FEC sublayers introduced by 802.3dj are not accounted for. The SM-PMA and Inner-FEC sublayers (clause 177 for longer-reach SMF, clause 184 or 186 for LR1 or ER1, respectively) would introduce much more delay than the current upper limits in this section.
(200GBASE-R, 400GBASE-R, 800GBASE-R are not actually shown in 802.3dj D2.1. But they should be, since the maximum delay is affected by the .dj sublayers).

*SuggestedRemedy*

Replace the 200Gbps paragraph with:
"At operating speeds of 200 Gb/s, a station's maximum physical layer delay is subject to the possible inclusion of MII-Extenders, SM-PMA conversions, Inner-FEC sublayers, and AUI interfaces. Designers should determine the worst-case delays for their specific context and PMD-type using the sublayer delays listed in Table 116-6"
And so on for 400Gbps, 800Gbps, and 1.6Tbps.

*Response* *Response Status* **W**

REJECT.

The comment is correct in pointing out that with PHYs that contain the Inner FEC and the SM-PMA; meeting the maximum 453 pause_quanta delay value may be problematic.

However the suggested remedy would result in removing the 453 pause_quanta value for all 200G PHY types and this is out-of-scope of the 802.3dj project.

In order for the editorial team to change the draft a detailed technical proposal would be necessary explaining the necessary changes, and these changes would need to be in scope for the 802.3dj project.

*Cl* **45** *SC* **45** *P* **71** *L* # 372

Ran, Adee
Cisco Systems

*Comment Type* **T** *Comment Status* **R** *(withdrawn)*

The MDIO interface registers are practically irrelevant in implementations of the PHYs and sublayers defined in this amendment. Configuration is done using software management interfaces that do not necessarily use the same register addresses, and possibly do not use a register map at all.

The functionality required by management is defined by the management variable list in each clause; the mapping to register addresses in clause 45 has no added value.

Maintaining clause 45 is an extremely tedious task and is a waste of editors' and reviewers' time. Eventually, it is likely not read by any user of the standard.

*SuggestedRemedy*

Remove clause 45 and all references to it, including register addresses, from this amendment.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **45** *SC* **45.2.1** *P* **71** *L* **48** # 457

Slavick, Jeff
Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

Time Sync Inner FEC or ER1 is not the sub clause title

*SuggestedRemedy*

Remove "TimeSync Inner FEC or ER1" from the two rows in Table 45-3 at lines 48 and 49

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Replace "TimeSync Inner FEC or ER1 FEC" with "TimeSync FEC"

*Cl* **45** *SC* **45.2.1.8** *P* **77** *L* **6** # 339

Simms, William
NVIDIA

*Comment Type* **E** *Comment Status* **R** *(bucket) (L)*

table 45-12 name vs section header inconsistent with table 45-14 and its section header

*SuggestedRemedy*

change table 45-12 title to Transmit disable register description location

*Response* *Response Status* **C**

REJECT.
The table title "Table 45-12-Transmit disable description location" matches what is in the base standard.

*Cl* **45** *SC* **45.2.1.10** *P* **77** *L* **34** # 340

Simms, William
NVIDIA

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

title capitalization difference with table title

*SuggestedRemedy*

make 45.2.1.10 "PMA/PMD Extended Ability register" 'or' Table 45-14 "PMA/PMD extended ability register bit definitions"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change table title to be lower case "extended ability".

*Cl* **45** *SC* **45.2.1.175** *P* **97** *L* **42** # 458

Slavick, Jeff
Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

This clause now includes Inner FEC/ER1 FEC.

*SuggestedRemedy*

Update PMA/PMD be FEC/PMA/PMD in the sub-clause title and text and references to this sub-clause (e.g. Table 45-3)

*Response* *Response Status* **W**

ACCEPT.

*Cl* **45** *SC* **45.2.1.258** *P* **110** *L* **29** # 282

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

The registers in this subclause are used by both the "Inner FEC" and the "ER1 FEC", but the Name field is "Inner FEC", and Description is "Inner_FEC_..." Since the ER1 FEC is not an "inner FEC", the description should be generalized. This issue exists in subclauses 45.2.1.259, 45.2.1.260, and 45.2.1.261 also.

*SuggestedRemedy*

Change the Name column from "Inner FEC." to "Inner FEC or ER1 FEC."
Change the Description column from "Inner_FEC_..." to "FEC_..."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.272** *P* **118** *L* **15** # 491

Slavick, Jeff Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

Title of this section does not need the word "duplication" as this is not a duplicate of another set of registers with the same information. It is a distinct set of registers that have the same function as other defined registers but for a different instance.

*SuggestedRemedy*

Remove "Duplication of" from the name of 45.2.1.272

*Response* *Response Status* **W**

ACCEPT.

*Cl* **45** *SC* **45.2.1.272** *P* **118** *L* **19** # 492

Slavick, Jeff Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

What registers are they duplicates of?

*SuggestedRemedy*

Update the range of the ILT register space copy to be the first 4000 registers and use a 4000 register area of the map.

Update the text of 45.2.1.272 from:
Inter sublayer training requires control registers for the upper and bottom AUI components. The upper AUI component has the same control functionality as the bottom AUI component so the relevant registers are duplicated with an address offset of 4000.

To:
Inter sublayer training requires control registers for the upper and bottom AUI components. Registers 1.4000 through 1.7999 have identical functionality to the register 1.0 through 1.3999 (address offset of 4000). The relevant registers from 1.0 through 1.3999 are used of control and status of the bottom AUI component. The relevant registers from 1.4000 through 1.7999 are used for control and status of the upper AUI component.

*Response* *Response Status* **W**

ACCEPT.

*Cl* **73** *SC* **73** *P***136** *L***3** # 199

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

After adding the Host class to Autonegotiation, the base standard introduction to AN in 73.1 needs to be updated.

*SuggestedRemedy*

In 73.1
Change: "The Auto-Negotiation function allows an Ethernet device to advertise modes of operation it possesses to another device at the remote end of a Backplane Ethernet link and to detect corresponding operational modes the other device may be advertising."
To: "The Auto-Negotiation function allows an Ethernet device to advertise modes of operation it possesses and its characteristics to another device at the remote end of a Backplane Ethernet link and to detect corresponding operational modes and characteristics the other device may be advertising."

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Change the text to:
"The Auto-Negotiation function allows an Ethernet device to advertise characteristics and modes of operation it possesses to another device at the remote end of a Backplane Ethernet link and to detect corresponding operational modes and characteristics that the other device may be advertising".

*Cl* **73** *SC* **73.6.1.1** *P***139** *L***2** # 373

Ran, Adee Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

The text of this clause includes "will" twice, and in both cases it seems like a normative requirement (so should be "shall").
There are several other instances of "will" in the document; they should be checked for compliance with the SA style manual ("will is only used in statements of fact") and changed if necessary. The suggested remedy lists some instances, and excludes instances for which I checked that "will" is appropriate.

*SuggestedRemedy*

Change "will" to "shall" twice in this subclause.
Check (and correct if necessary, e.g. to "is" or variants) other instances of "will" in clauses 73, and in 177.4.6, 177.5.2, 180.10.4, 184.4.9, 185.10.4, 186.2.3.3, 186.2.3.5.9, 186.2.3.8, 186.2.4.7.5, 187.10.4, 174A.10.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The style manual states the following: "The word will is deprecated and shall not be used when stating mandatory requirements; will is only used in statements of fact."
The two "will"s mentioned in 73.6.1.1 along with the one in 73.6.1.2 are in the base standard and so should be left as is.
The "will"s in 177.4.6, 177.5.2, 186.2.3.3 are statements of fact, so should remain.
The "will"s in 186.2.3.5.9 and 186.2.3.8 have been reviewed and are considered to be correct as written.
In 174A.10 the "will"s are consequences and should remain.
In 186.2.4.7.5 change "will need" to "are".
In 180.10.4, 185.10.4, and 187.10.4 change "will be met" to "are met".
The "will"s in in 184.4.9 delete the word "will".

*Cl* **73** *SC* **73.9.1.1** *P***147** *L***44** # 200

Bruckman, Leon Nvidia

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

Missing word

*SuggestedRemedy*

Change: "one of values" to: "one of three values"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **73** *SC* **73.11.4.5** *P* **153** *L* **13** # 341

Simms, William NVIDIA

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

just a sanity check on the wording in quotes in the Value/Comment field of the table

*SuggestedRemedy*

should the langauge in quotes be removed?

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Remove the text in quotes "Recognized as end of link partner's Next Pages"

*Cl* **73A** *SC* **73A.1a** *P* **696** *L* **36** # 194

Bruckman, Leon Nvidia

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

Host class is not negotiated, but it is part of an autonegotiation page. This may create confusion

*SuggestedRemedy*

Add footnote to Table 73A-1b: Host class is only reported, no negotiation is required."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **116** *SC* **116.3.3.3.1** *P* **171** *L* **18** # 334

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **R** *anagement intervention (CG)*

A value of FAIL will require management intervention. Recommend stating this explicitly.

*SuggestedRemedy*

Add sentence, "Management intervention is required".

*Response* *Response Status* **C**

REJECT.
For this case, the value FAIL may not indicate the need for management intervention since for this case ILT as defined in Annex 178B is not supported. It would therefore not be generally correct. Also, the statement would in a small way affect legacy clauses.

*Cl* **116** *SC* **116.3.3.3.1** *P* **171** *L* **33** # 335

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *anagement intervention (CG)*

A value of FAIL will require management intervention. Recommend stating this explicitly.

*SuggestedRemedy*

Add sentence, "Management intervention is required".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
In the instance, a value of FAIL is likely initiated by the ILT state diagram. Also, since it is stated for "IN_PROGRESS" and "TRAINING" it is stated "Management intervention is not required." It would to provide complementary guidance for the FAIL value. Also, there is the possibility in some implementations that management intervention is not required.
Add sentence:
"Management intervention might be required."

*Cl* **116** *SC* **116.3.3.3.1** *P* **171** *L* **34** # 201

Bruckman, Leon Nvidia

*Comment Type* **T** *Comment Status* **A** *anagement intervention (CG)*

For the values of SIGNAL_OK = READY or IN_PROGRESS, it is specified that "Management intervention is not required".
When SIGNAL_OK = FAIL, management intervention may be required, but this is not indicasted.

*SuggestedRemedy*

Add the following text to the end of definition of the FAIL value of SIGNAL_OK: "Management intervention may be required.".
Also in the second paragraph in page 172, at the end of the paragraph that starts: "A value of FAIL indicates." add the following text: "and management intervention may be required."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the responses to comment #335 and #336.

*Cl* **116** *SC* **116.3.3.4.1** *P* **172** *L* **5** # 466

Slavick, Jeff — Broadcom

*Comment Type* **T** *Comment Status* **A** *ucket) service interface (CG)*

FAIL status is the state presented if none of the other states apply. The text states that FAIL is when communication is not established. But the states of IN_PROGRESS and READY would meet that FAIL criteria too as they have yet to establish communication.

*SuggestedRemedy*

Change "or has not establisshed communication"
To "or is unable to establish communication"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
In contrary to the comment, "READY" is defined indicating "that communication with the next higher sublayer is established but communication with an upper ISL has not completed".
"IN_PROGRESS" is defined as indicating "that the sublayer is establishing communication with the next higher
sublayer" and thus communication is not established. So there is some ambiguity here.
The distinction is that the attempt to establish communication was unsuccessful.
On page 172 line 5...
Change "or has not established communication"
To "or is unable to establish communication"

*Cl* **116** *SC* **116.3.3.4.1** *P* **172** *L* **8** # 336

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *anagement intervention (CG)*

A value of FAIL will require management intervention. Recommend stating this explicitly.

*SuggestedRemedy*

Add sentence, "Management intervention is required".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The addition statement applies on to the last sentence in this paragraph which implies that ILT is in use. Also, there is the possibility in some implementations that management intervention is not required.
Append the last sentence in the paragraph with "and management intervention might be required."

*Cl* **116** *SC* **116.5** *P* **177** *L* **11** # 493

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **R** *(bucket) (CG)*

Can we move footnote d to the same place as foonote b?

*SuggestedRemedy*

In Table 116-8
Change "(UI)b" to "(UI)b,d"
Remove the words "at this Skew point" from the footnote d definition.

*Response* *Response Status* **W**

REJECT.
The footnote applies only to SP1 through SP6. It does not apply to "at PCS receive" since the extra delay due to the source PMA codeword interleaving has been removed by the destination PMA.

*Cl* **118** *SC* **118.1** *P* **179** *L* **40** # 342

Simms, William — NVIDIA

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

observation that associated clauses are not completely in increasing order

*SuggestedRemedy*

note that clause 78 is at bottom of list in table 118-a (and also table 118-b) rather than at top.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Clause 78 was placed at the bottom of Table 118-a and Table 118-b to be consistent with the approach taken in previous projects (Clauses 84, 85, 86, 87, 88, etc). However for the equivalent tables being added in this project, the clauses are now listed in numerical clause order (Clauses 179, 180, 181, 182, etc...) . For consistency it makes sense to reoder Tables 118-a and 118-b in numerical clause order, and do the same for Tables 171-1 and 171-1a.

Reorder Table 118-a and Table 118-b in numerical clause order.

Reorder Table 171-1 and Table 171-1a in numerical clause order.

*Cl* **119** *SC* **119.2.1** *P* **184** *L* **7** # 498

Opsasnick, Eugene — Broadcom

*Comment Type* **E** *Comment Status* **R** *(bucket) (L)*

The term "data units" should not be hyphenated unless it is functioning as a compound adjective directly before a noun.

Hyphanated example: "The network handles a high volume of data-unit transfers.".

Non-hyphenated example: "The network transmits many data units."

Although both forms, hyphenated and non-hyphenated, are used throughout the base standard, the new clauses in 802.3dj as well as updates to previous clauses should use the correct form. Note that "data units" is used 22 times throughout D2.1 of 802.3dj, and 119.2.1 contains the only two occurance of "data-units". In the base standard 802.3-2022, "data units" is used 51 times and "data-units" is used 34 times (which should also be fixed.). A maintenance request can be submitted to fix the base standard if this comment is accepted.

*SuggestedRemedy*

Change "data-units" to "data units" in the update to the fourth pargraph of 119.2.1. The first sentence should be changed
From:
"Transmit data-units are sent to the service interface via the PMA:IS_UNITDATA_i.request primitive."
To:
"Transmit data units are sent to the service interface via the PMA:IS_UNITDATA_i.request primitive."

The second sentence should be changed
From:
"The SIGNAL_OK parameter of the PMA:IS_SIGNAL.request primitive is set to OK when the transmit data-units are valid and is set to FAIL otherwise."
To:
"The SIGNAL_OK parameter of the PMA:IS_SIGNAL.request primitive is set to OK when the transmit data units are valid and is set to FAIL otherwise."

*Response* *Response Status* **C**

REJECT.

The comment correctly points out that in the context of 119.2.1 the correct term is "data units" and not "data-units". However, Clause 119 and the majoity of the legacy PCS clauses (49, 82, 97, 126 and 149) use the term "data-units". Note, this issue has been addressed in the recent PCS clauses , where Clauses 172 and 175 correctly use "data units".

However this project is only amendning 119.2.1 to add two sentences at the end of the fourth paragrpah. The term "data-units" was used for the new text being added for consistency with the other three occurances of "data-units" in 119.2.1 (in the first sentence of the fourth paragraph, and in the fifth and sixth paragraphs). In addition it is noted that comment #675 against D2.0 (https://www.ieee802.org/3/dj/comments/D2p0/8023dj_D2p0_comments_final_id_v2.pdf) changed "data units" to "data-units" for the next text being added, for consistency with the other three occurances of 119.2.1 (that are not being amended).

The suggested remedy would change the first sentence of the fourth paragraph, which is technically out of scope. In addition to changing text that is technically out of scope, the suggested remedy would result in two occurances of "data units" and two occurances of "data-units" within 119.2.1, which is likely to attract additional comments (simlar to comment #675 against D2.0). It is preferrable to use "data-units" for the new sentence being added, for consistency with the three other occurances of "data-units" in 119.2.1. A maintenance request can be submitted to fix this issue globally for all applicable occurances of "data-units" in all of the impacted PCS clauses (including Clause 119).

*Cl* **119** *SC* **119.2.5.3** *P* **185** *L* **11** # 455

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

Error marking needs to be more explicit about corrupting which 66b blocks following an uncorrected codeword are the ones from the same decoder. In 800G and 1.6T those could be later in the flow of 66-bit blocks at the MII interface and not the ones directly after 66-bit blocks from the uncorrectable block.

*SuggestedRemedy*

Change:
then the first four 66-bit blocks following the uncorrected codewords shall also be set to an error block.

To:
then the first four 66-bit blocks of the following set of two associated codewords processed by the Reed-Solomon decoder shall also be set to an error block.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Change:
"... then the first four 66-bit blocks following the uncorrected codewords shall also be set to an error block."

To:
"... then the first four 66-bit blocks from the next two associated codewords processed by the Reed-Solomon decoder shall also be set to an error block to account for the possible error propagation by the descrambler."

Implement with editorial license.

*Cl* **119** *SC* **119.3.4a** *P* **187** *L* **4** # 374

Ran, Adee

Cisco Systems

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

The new counter is optional. The text says "The following optional counter may be implemented for these PHY types" followed by a list of PHYs - but obviously it is permitted ("may equals is permitted to") to implement the counter in any PCS; the same PCS can be part of different PHYs (e.g. depending on the module type). So the restricted list does not make sense.
Removing the restriction would make the counter simply optional. Adding an optional feature to an existing specification is not a violation of scope - it has been done before (e.g., EEE, TimeSync) and we are doing similar things in this project (e.g. adding optional stateless encoder and decoder).

Similarly for 119.3.4b FEC_codeword_error_bin_i

*SuggestedRemedy*

Change "The following optional counter may be implemented for these PHY types:" to "The following counter is optional".
Implement similar change in 119.3.4b.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **120** *SC* **120.1.4** *P* **194** *L* **10** # 432

Nicholl, Gary

Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *ppm (L)*

List items (7) and (9) essentially mean that the only way to support a 200G/400G PHY which includes 200G/lane technology in a legacy host with AUIs running at 100ppm is to use an Extender. The Extender would convert beteen the two ppm rates, allowing the existing AUIs to continue to run at 100ppm and the new 200G/400G PHY to run at 50 ppm.

But the consequence of this is that two types of optical module are required, a simple one which can be used in hosts with AUIs that are running at 50ppm and a more complex one (which includes a PHY XS and PCS) which can be used in legacy hosts where the AUIs are running at 100ppm.

But the question is how does an end user know what rate (50ppm or 100ppm) the AUIs on his host are running at, and therefore which version (simple or complex) of optical module is required ?

List items 7 and 9 essentially create two different versions of 200G/400G AUIs (one running at 50ppm and one running at 100ppm), with no obvious way to identify the different versions.

*SuggestedRemedy*

A presentation will be provided to further discuss the issue and provide some possible solutions.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #188.

*Cl* **120** *SC* **120.1.4** *P* **194** *L* **15** # 188

Ofelt, David — Juniper Networks / HPE

*Comment Type* **TR** *Comment Status* **A** *ppm (L)*

We have changed the ppm tolerance of the 200Gb/s SERDES to be 50ppm in all cases. This leads to interoperability issues when plugging an older PMD (generated with 25Gb/s or 50Gb/s SERDES) into a new 200Gb/s SERDES-based receiver or when a new 802.3dj PMD is plugged into an older box using 25Gb/s or 50Gb/s SERDES due to the fact one end of those links generates data at 100ppm and the receive side can only handle 50ppm. The solution is to insert an XS to do rate matching. At the moment, I believe this interop issue is not called out anywhere in the draft nor is the fact that adding the required XS will also cause the PTP accuracy to suffer. Note that this was not an issue in the 100Gb/s SERDES because they were specified to tolerate 100pm at the receiver, so there were no multi-generational interop issues. This is also not a problem when 100Gb/s source and 200Gb/s sourced PMDs are connected because the 100Gb/s SERDES are specified to have transmitters that are 50ppm.

The set of footnotes in this subclause attempt to provide the full set of rules for managing ppm, but the details are incomplete for the cases mentioned here.

As it stands, the spec is not broken, but this is a subtle interoperability issue of a sort that we've never introduced previously, therefore a helpful note seems appropriate.

*SuggestedRemedy*

Add some additional informative information to the ppm guideline footnotes in 120.1.4 to clarify the subtle 100/50ppm intereop cases that need an XS as well as a comment that this will degrade PTP accuracy.

A supportning presentation will be forthcoming.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

The CRG reviewed the following presentation:
https://www.ieee802.org/3/dj/public/25_09/nicholl_3dj_02_2509.pdf.

The 802.3dj draft does allow interoperability between older generation components operating at 100ppm and new components that operate at 50ppm, but there are some subtle requirements that are not explicitly stated.

Update the text of guideline 7) in 120.1.4 as follows:
"For a PHY that includes a 200GAUI-1 interface or a 200GBASE-KR1, 200GBASE-CR1, 200GBASE-DR1, or 200GBASE-DR1-2 PMD, the signaling rate range for a 200GAUI-8, 200GAUI-4, or 200GAUI-2 PMA output that is in the same package as the PCS shall be limited to +/- 50ppm, instead of +/-100ppm. Alternatively, a 200GAUI-8, 200GAUI-4, or 200GAUI-2 PMA output running with +/-100ppm shall be implemented within a 200GMII Extender with clock rate adaptation."

Make a similar update to the text of guideline 9) in 120.1.4

Implement with editorial license.

*Cl* **172** *SC* **172.2.5.3** *P* **253** *L* **43** # 459

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **R** *error marking (L)*

The error marking of extra blocks needs to apply to both the 119 stateless decoder usage and the 172.2.5.9 version.

*SuggestedRemedy*

Add an extra exception to 172.2.5.3.
"The error marking of the additional four 66-bit blocks when using stateless decoder define in Clause 119 should be done when using the stateless decoder define in 172.2.5.9.2 as well."

Add PICS item to indicate if error marking of extra four 66-bit blocks is done.

*Response* *Response Status* **W**

REJECT.

The comment is correct that the error marking issue is the same for both decoders. However, the original CL 172 stateless decoder was not modified because it is out of scope.

If an implemention uses the stateless decoder defined in 172.2.5.9.2 of 802.3df, then there is no additional error marking, but it is still standard compliant. New implementations are strongly recommended to use the stateless decoder defined in 119.2.5.8.2 which uses the improved error marking, making changes to the 172.2.5.9.2 unnecessary.

*Cl* **174** *SC* **174.2.5** *P* **263** *L* **32** # 500

Opsasnick, Eugene Broadcom

*Comment Type* **E** *Comment Status* **A** *(bucket) (CG)*

The term "1.6TAUI-n" is used to represent either a 1.6TAUI-8 or a 1.6TAUI-16. "1.6TAUI-n" is usually used a singular noun as in the first sentence of 174.2.5, line 31 that states "A 1.6 Tb/s Attachment Unit Interface (1.6TAUI-n) provides an electrical interface ....". However in the second sentence on line 32, the same term is used as a plural noun which sounds funny. The standard should stick to using "1.6TAUI-n" as a singular noun whenerver possible.

*SuggestedRemedy*

Change the second sentence of 174.2.5
From:
"1.6TAUI-n are defined for chip-to-chip (C2C) and chip-to-module (C2M) implementations."
To:
"Two widths, 8-lane and 16-lane, of 1.6TAUI-n are defined for chip-to-chip (C2C) and chip-to-module (C2M) implementations."

Change the last sentence of 174.4.5
From: "1.6TAUI-n are instantiated within a Physical Layer implementation as described in 176B.7"
To:
"Each 1.6TAUI-n is instantiated within a Physical Layer implementation as described in 176B.7".

Similar changes should be made to 169.2.4a for the updates to the summary of the 800GE architecture.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy, including the suggested changes to 169.2.4a, with editorial license.

*Cl* **174** *SC* **174.2.5** *P* **263** *L* **35** # 501

Opsasnick, Eugene Broadcom

*Comment Type* **E** *Comment Status* **R** *(bucket) (CG)*

The list of the 4 types of 1.6TAUI-n on lines 35-41 should be presented as a dashed list. This would be consistent with similar lists of AUIs in 118.1.3 , and 171.4.

The similar list of 800-GAUI-n in 169.2.4a should also be changed to a dashed list.

*SuggestedRemedy*

Change:
"The 1.6TAUI-16 C2C is specified in Annex 120F.

The 1.6TAUI-16 C2M is specified in Annex 176D.

The 1.6TAUI-8 C2C is specified in Annex 176C.

The 1.6TAUI-8 C2M is specified in Annex 176D."

To:
" - The 1.6TAUI-16 C2C is specified in Annex 120F.
- The 1.6TAUI-16 C2M is specified in Annex 176D.
- The 1.6TAUI-8 C2C is specified in Annex 176C.
- The 1.6TAUI-8 C2M is specified in Annex 176D."

In 169.2.4a on page 199, starting on line 51, change the four separate paragraphs of 800GAUI-n types to a dashed list.
Change:
"The 800GAUI-8 C2C is specified in Annex 120F.

The 80GAUI-8 C2M is specified in Annex 120G.

The 800GAUI-4 C2C is specified in Annex 176C.

The 800GAUI-4 C2M is specified in Annex 176D"

To:
" - The 800GAUI-8 C2C is specified in Annex 120F.
- The 80GAUI-8 C2M is specified in Annex 120G.
- The 800GAUI-4 C2C is specified in Annex 176C.
- The 800GAUI-4 C2M is specified in Annex 176D"

*Response* *Response Status* **C**

REJECT.
The proposed changes would make the formatting of 174.2.5 inconsistent with the other subclauses under 174.2. The proposed changes do not improve the clarity or accuracy of the draft.

*Cl* **174A** *SC* **174A.6** *P***717** *L***43** # 240

He, Xiang Huawei

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

Is it really necessary to specify CRC error ratio to three digits?

*SuggestedRemedy*

Consider to keep only two digits like all other error ratios.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The extra two digits will have insignificant impact on the the FLR which is specified with 2 significant figures.
Change "5.706E-11" to "5.7E-11".

---

*Cl* **174A** *SC* **174A.8.2** *P***720** *L***6** # 456

Slavick, Jeff Broadcom

*Comment Type* **TR** *Comment Status* **R** *(bucket) (CG)*

optical clauses are using block error ratio methods in the "recevier functional test". In 174A8.2 we talk about splitting the data based "p physical lanes". But for example in FR4 there's only one phyiscal lane (fiber) but you have the data flowing over mulitple lanes (wavelengths) in that single physical lane.

*SuggestedRemedy*

remove the word physical

change physical to input/output

*Response* *Response Status* **W**

REJECT.
For WDM duplex PMD types, each wavelength is a physical lane.
As an example, the overview in 183.1 says that for 800GBASE-FR4 and 800GBASE-LR4 "The PMDs provide point-to-point 800 Gb/s Ethernet links over four wavelength division multiplexing (WDM) lanes on single-mode fiber". It never refers to the fiber a being a lane.

---

*Cl* **174A** *SC* **174A.8.2** *P***720** *L***8** # 241

He, Xiang Huawei

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CG)*

The number of physical lanes is p, so the index i should be in the range" 0 through p-1", instead of "0 through p".

*SuggestedRemedy*

Change "p" to "p-1"

*Response* *Response Status* **W**

ACCEPT.

---

*Cl* **174A** *SC* **174A.8.2** *P***720** *L***9** # 242

He, Xiang Huawei

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CG)*

"test_block_error_bin_i_k" is used in other clause, instead of "test_block_error_count_i_k".
Change "count" to "bin".
Do the same for "test_block_error_count_i_16p".

*SuggestedRemedy*

Change "count" to "bin" for "test_block_error_bin_i_k" and "test_block_error_count_i_16p".

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Change "test_block_error_count_i_k"
To "test_block_error_bin_i_k"
Change "test_block_error_count_i_16p"
To: "test_block_error_bin_i_16p"
Implement with editorial license.

---

*Cl* **174A** *SC* **174A.8.3** *P***720** *L***16** # 410

Ran, Adee Cisco Systems

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

174A includes many instances of "histogram". This term is potentially misleading for readers because its typical meaning uses counts, not probabilities.
To avoid going into more precise but less common mathematical terms, I suggest (based on https://www.itl.nist.gov/div898/handbook/eda/section3/histogra.htm) using the term "Relative histogram". To minimize disruption to the text, the existing term can be retained, but a clarification should be provided.

*SuggestedRemedy*

Add the following informative NOTE after the first paragraph of 174A.8.3:
NOTE--Within this annex, the term "histogram" denotes an array that holds values normalized such that the sum of the values is one. This is sometimes referred to as a relative histogram.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174A** *SC* **174A.8.3** *P* **720** *L* **39** # 243

He, Xiang Huawei

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CG)*

In Equation 174A-1 and 174A-2, "test_block_error_count_i_k" should be "test_block_error_bin_i_k".

*SuggestedRemedy*

Change "test_block_error_count_i_k" to "test_block_error_bin_i_k" in Equation 174A-1 and 174A-2.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Note that comment #242 proposed to rename the counters where they are defined in 174A.8.2.
Implement the suggested remedy with editorial license.

*Cl* **174A** *SC* **174A.8.4** *P* **720** *L* **52** # 244

He, Xiang Huawei

*Comment Type* **TR** *Comment Status* **R** *(bucket) (CG)*

#Definition of k#
Are we defining the variables at the first appearance and use this definition across this Annex? Or the definition varies from subclause to subclause?
For example, if k is defined in 174A.8.2, where it says k is "in the range 0 through 15" (line 9) and again in 174A.8.3 as "k<16" (line 19), but in 174A.8.4 it has "k = 16" (line 52)? If this is a different k, we need to define it locally in this subclause (and in each subclause it is used). Otherwise we should stick to "0 through 15" as the range for "k".

*SuggestedRemedy*

Define the range of k clearly in the beginning, adding something like "k in the range 0 through 15 in Annex 174A", if this is the same k across this Annex. Do not redefine it, or at least use the same definition whenever it is used.

*Response* *Response Status* **W**

REJECT.
This location as well as page 720 line 19 are not defining k, but rather defining the counts or histograms differently for different subranges of k. The indexing of the counters is unfortunately complicate because we named the 17th counter differently then the rest so is not conveniently indexed (see page 720 line 9).
The definitions of k are otherwise consistent and correct. The proposed remedy does not improve the clarity.

*Cl* **174A** *SC* **174A.8.5** *P* **721** *L* **29** # 245

He, Xiang Huawei

*Comment Type* **TR** *Comment Status* **R** *(bucket) (CG)*

#Definition of k#
"for all k>0" meaning "0<k<16" or "0<k<n"? Is 16 included?

*SuggestedRemedy*

Define the range of k clearly in the beginning, adding something like "k in the range 0 through 15 in Annex 174A", if this is the same k across this Annex. Do not redefine it, or at least use the same definition whenever it is used.

*Response* *Response Status* **W**

REJECT.
Resolve using the response to comment #244.

*Cl* **174A** *SC* **174A.8.7** *P* **722** *L* **3** # 55

Brown, Matt Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CG)*

"AUI component" is a new term introduced in 802.3dj.

*SuggestedRemedy*

Add a nomenclature subclause in Annex 174A and provide a definition for AUI component using the definition from 178B.3. Implement with editorial license.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174A** *SC* **174A.10.4** *P* **725** *L* **8** # 246

He, Xiang Huawei

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CG)*

The range for "i" is not clearly defined. While reading this I was confused whether this is only for the test channel or should this include the possible AUI's in the PHY receiver under test. If it is only PMD, then total lane number is p - we should clearly state that, and remove "or AUI component" in step b). If it includes the possible AUIs in the PHY receiver, the total number of lanes would be p + N*n, where N is the number of AUIs?

*SuggestedRemedy*

Specify the total number of lanes to be considered, i.e. range of "i" in this subclause.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
The method defined in 174A.10.4 is for the entire PHY receive path as measured at the PMD inputs and is not relevant to the AUI or AUI components.
Change "the PMD or AUI component" to "the PMD".
Change "For each lane i" to "For each PMD input lane i"

*Cl* **174A** *SC* **174A.12** *P* **726** *L* **4** # 211

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CG)*

In Figure 174A-6, the spans labelled "Physical Layer implementation" were meant to illustrate the portion of this block diagram that is within the Physical Layer, similar to the spans for PHY and xMII extender.

*SuggestedRemedy*

In Figure 174A-6, change "Physical Layer implementation" to "Physical Layer" in two places.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174A** *SC* **174A.12** *P* **727** *L* **34** # 451

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

The PMD link BER is wrong in figures , 174A-9. and a74A-10. The BERs do not add correctly to the PCS-toPCS path allocation. It is stated correctly as 2.28e-4 in Table 174A-1.

*SuggestedRemedy*

Change "2.76e-4" to "2.24e-4" in these two figures.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Table 174A-1 specifies BER of 2.28E-4 for the PMD link.
In Figure 174A-9 and Figure 174A-10 change the PMD link BER allocation to 2.28E-4.
[Editor's note: Changed line from 14 to 34]

*Cl* **174A** *SC* **174A.12** *P* **729** *L* **30** # 279

Kutscher, Noam — Marvell

*Comment Type* **T** *Comment Status* **R** *(bucket) (CG)*

Line 30 & 33 are the same line -'xAUI-n C2Cb'

*SuggestedRemedy*

Delete one of them.

*Response* *Response Status* **C**

REJECT.
Each row in Table 174A-2 represents one ISL in a PCS-to-PCS path. There is one xAUI-n C2C link at one end, a PMD link in the middle, and another xAUI-n C2C link at the other end. The sum of allocations to these links is equal to the net allocation to the PCS-to-PCS path. The table is correct as is. A similar approach is taken in Table 174A-1.

*Cl* **174A** *SC* **174A.12** *P* **729** *L* **48** # 212

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

BER specified for xAUI-n C2C in Table 174A-3 (0.1E-4) is larger than that specified in the preceding tables for PHYs. For the latter, the numbers provided are the limits for the xAUI-n defined in Annex 176C and Annex 176D which were chosen to leave sufficient BER allocation for the PMD. For the the xMII Extender however there is room for excess BER on the C2C. The value 0.1E-4 is thus used allowing use of 50 Gb/s per lane (Annex 120D) and 100 Gb/s per lane xAUI-n (Annex 120F) xAUI-n C2C which are specified to 0.1E-4. A note for the reader to explain this would be helpful as it is not obvious.

*SuggestedRemedy*

In Table 174A-3, add a table note related to the C2C "A value of 0.1E-4 rather than 0.08E-4 is allocated to an xAUI-n C2C in an xMII Extender since there significant BER margin and this allows the use of an xAUI-n defined in Annex 120D or Annex 120F to be used without reducing the specified BER limit."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174A** *SC* **174A.12** *P* **729** *L* **48** # 213

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

BER for the XS-to-XS path is 2.21E-4. However, the total allocation to the two ISLs withing an XS-to-XS path (xMII extender) is 0.34. So there is significant margin. The allocation to the XS-to-XS path is based on the FLR allocated to the XS-to-XS path capability of the RS-FEC. The allocation to the xAUI-n is based on the specified limits for permitted xAUI-n, the sum of which is much lower than necessary to meet the FLR target. A note for the reader to explain this would be helpful as it is not obvious.

*SuggestedRemedy*

In Table 174A-3, add a table note related to the XS-to-XS path BER allocation as follows: "The BER allocation for the XS-to-XS path is based on the FLR target and the capability of the RS-FEC while the BER per ISL is based on the specified limits for permitted xAUI-n C2C and C2M, which were constrained by their respective specifications. This results in a significant BER margin for the XS-to-XS and PCS-to-FEC paths."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **175** *SC* **175.2.4.6.1** *P* **281** *L* **26** # 237

Wang, Xuebo — Huawei Technologies Co., Ltd.

*Comment Type* **T** *Comment Status* **R** *AM padding (L)*

Initial states of the two PRBS9 generators in flow 0 and flow 1 should be different, in order to have good baseline wander performance.

*SuggestedRemedy*

Add the sentence: the PRBS9 generators in flow 0 and flow 1 shall be initialized to non-zero values different from each other.

*Response* *Response Status* **C**

REJECT.
The padding in flow 0 and flow 1 is different in length by three bits due to the FEC degrage state being added only in flow 1. Since the size of the padding is different and PRBS9 state is held beween AM pads, the relationship between the padding of flow 0 and flow 1 is constantly changing and setting the intital states would likely not have any meaningful effect. The 1.6TbE alignment markers were analyzed for clock content and wander and the results were found to be acceptable as presented in https://www.ieee802.org/3/dj/public/adhoc/optics/0623_OPTX/wong_3dj_logic_01_230615.pdf . If there is additional analysis that shows the baseline wander can be improved with a change, then it should be presented to the WG before a change is made to the draft.

*Cl* **175** *SC* **175.2.4.6.1** *P* **282** *L* **7** # 238

He, Xiang — Huawei

*Comment Type* **E** *Comment Status* **A** *AM figure (L)*

In Figure 175-4, the RS-FEC symbol indices starts from 0 (A0/B0/C0/D0). I understand this is in line with the index order of AM bits. However, this is inconsistent with Figure 175-7 which starts from RS-FEC symbols with highest indices first.

*SuggestedRemedy*

Update indices of RS-FEC symbols for codewords A, B, C, and D in Figure 175-4 such that they begin with the highest index(543) and end with lowest index (0).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The legend in Figure 175-4 defines how numbering of A0-A51 (and the same for B,C,D) are used relative to the alignment markers (and am_mapped_f0 and am_mapped_f1). So everyting in Fig. 175-4 is self-consistent and consistent with the Figure 175-3 earlier in the same subclause. The opposite numbering that is used in Fig. 175-7 comes later in subclause 175.2.4.10 and corresponds to the pseudo-code in subclause 175.2.4.9 and is done this way to to be similar to Clause 82 and Clause 119 (Figure 175-7 should probably not be changed).

Make the following changes to Fig. 175-4:

Change A0 to A543 (and the same for B0, C0, D0).
Change A15 to A528 (and the same for B15, C15, D15).
Change A16 to A527 (and the same for B16, C16, D16).
Change A31 to A512 (and the same for B31, C31, D31).
Make other symbol indexing changes as appropiate.
Change the legend of that shows the relationship of Ax, Bx, Cx, and Dx to am_mapped_f0 and am_mapped_f1 accordingly.

Implement with editorial license.

*Cl* **175** *SC* **175.2.4.7** *P* **285** *L* **5** # 343

Simms, William — NVIDIA

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

"round robin" instead of "round-robin" used elsewhere in document

*SuggestedRemedy*

change "round robin" to "round-robin" also on line 8

*Response* *Response Status* **C**

ACCEPT.

*Cl* **175** *SC* **175.2.5.5** *P* **288** *L* **32** # 71

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

Boolean variables are not "deasserted", they are set to "false".

*SuggestedRemedy*

Change: It is deasserted when rx_am_sf<1> is deasserted
To: It is set to false when rx_am_sf<1> is deasserted

*Response* *Response Status* **C**

ACCEPT.

*Cl* **175** *SC* **175.2.5.5** *P* **288** *L* **37** # 72

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

Boolean variables are not "deasserted", they are set to "false".

*SuggestedRemedy*

Change: It is deasserted when rx_am_sf<2> is deasserted
To: It is set to false when rx_am_sf<2> is deasserted

*Response* *Response Status* **C**

ACCEPT.

*Cl* **175** *SC* **175.2.5.7** *P* **288** *L* **53** # 423

Nicholl, Shawn AMD

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

Currently, there is a note (in 175.2.4.3) for mapping to OTN. But no corresponding note for demapping from OTN.

*SuggestedRemedy*

At the end of "175.2.5.7 Block collection", add "Note -- The stream of 257-bit blocks generated by this process is used as the reference signal for de-mapping from OTN."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

*Cl* **175** *SC* **175.2.6.2.2** *P* **290** *L* **8** # 73

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 175.2.5.7, add to the end of the definition of amps_lock<x>:
"The value of amps_lock<x> is set by the alignment marker lock state diagram (see Figure 119-12)."
Implement with editorial license.

*Cl* **175** *SC* **175.2.6.2.2** *P* **290** *L* **42** # 74

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Modify the definition of the reset variable by adding: ", and is false otherwise." to end of the last sentence.
Implement with editorial license.

*Cl* **175** *SC* **175.3** *P* **293** *L* **34** # 378

Ran, Adee
Cisco Systems

*Comment Type* **E** *Comment Status* **R** *(bucket) (L)*

FEC degrade is part of the PCS functionality. It should be under 175.2 PCS functions. Similarly for Loopback in 175.4.

*SuggestedRemedy*

Move 175.3 and 175.4 to become subclauses of 175.2.

*Response* *Response Status* **C**

REJECT.
The whole clause is the definition of the PCS functionality. Subclause 175.2 describes the PCS top-level interfaces and TX and RX data manipulations mainly for "normal flow" of data.". Loopback functionality does not fall into this category for 175.2 and should remain as a separate subclause at the same level as 175.2 (as is also done in other PCS clauses such as 119 and 172). FEC degrade has a portion that is performed in the TX path and a portion that is performed in the RX path, and these are described in 172.2.2 (TX functionality) and 172.2.3 (RX functionality). Subclause 175.3 is used at this level to tie the two parts of the FEC degrade feature together and act as an anchor for other clauses to reference.

---

*Cl* **175** *SC* **175.3** *P* **293** *L* **40** # 377

Ran, Adee
Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

"FEC degrade detection is specified in 175.2.5.3. FEC degrade detection is optional." 175.2.5.3 does not specify FEC degrade detection; it only changes the definition of the counters (and thus modifies the criteria for detection). This subclause is the specification of the Reed-Solomon decoder, and it refers to the original specification in 119.2.5.3 - that is where FEC degrade is actually defined. A direct reference would be friendly for the reader.

*SuggestedRemedy*

Change to "FEC degrade detection is specified in 119.2.5.3 with the exception listed in 175.2.5.3. FEC degrade detection is optional."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

[Editor's note: changed page from 287 to 293]

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*Cl* **175** *SC* **175.7** *P* **295** *L* **3** # 6

Brown, Matt
Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

Editor's note expire's after Draft 2.1.

*SuggestedRemedy*

Delete editor's note.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **175** *SC* **175.8** *P* **295** *L* **17** # 59

Brown, Matt
Alphawave Semi

*Comment Type* **T** *Comment Status* **R** *(withdrawn)*

The MDIO interface and register addressing is obsolete. In devices of this complexity that structure does not suffice and proprietary register maps and APIs are provided. For new clauses in 802.3dj the various management variables are defined within the clause and listed in management variable tables. References to optional MDIO registers and references in Clause 45 are provided.

*SuggestedRemedy*

Delete all references to register mappings and descriptions in Clause 45 and, where necessary, include necessary heuristics in the clause that uses the management variables. Alternately, define a new management variable clause that defines the variable heuristics, e.g., number of bits, R/W, clear-on-read, without specific addressing or assumed register sizes (i.e., define by name, not address).
Applies to clauses 45, 178 through 183, and annexes 176C and 176D.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **175** *SC* **175.9.4.2** *P* **299** *L* **11** # 8

Brown, Matt
Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

The PCS lane number is captured to a management variable, which would then be mapped to MDIO or alternate register as defined in 175.8.

*SuggestedRemedy*

For RF2, change the Feature to "PCS lane number is captured
to a management variable" and in the Status column change "MD:M" to "M".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **175** *SC* **175.9.4.4** *P* **300** *L* **31** # 7

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CG)*

The management PICS do not align well with the specifications. The management variables are defined at the end of the clause. The subclause specifies management variables, not management objects. It specifies an "alternate" not "equivalent" mechanism if MDIO is not implemented. The "alternate" method is mandatory, not optional, if MDIO is not implemented.

*SuggestedRemedy*

Move 179.9.4.4 "Management", to the end of 179.9.4.
In M1, change feature to "Alternate access to PCS management variables is provided" and change status to "MD:M".
For Clause 176 through Clause 187, Annex 176C, and Annex 176D, align the PICS with the updated 179.9.4.4 and including *MD in the "Major capabilities/options" subclause.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Note that the suggested remedy refers to 179.9.4.4 and 179.9.4, but those references should be to 175.9.4.4 and 175.9.4.
Implement the suggested remedy with editorial license and with consideration of the resolution of comment #376 which suggests removing most of the PICS content.
[Editor's note: CC 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 176C, 176D]

*Cl* **176** *SC* **176.2** *P* **306** *L* **29** # 354

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(bucket) (L)*

"When the client sublayer is an xAUI-n". An AUI has never (to my knowledge) been defined as a sublayer, but rather a physical instantiation of a service interface. If we are going to treat it as a sublayer now, we need to formally state that.

*SuggestedRemedy*

Clarify whether we are treating xAUI-n as a sublayer.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
The comment correctly points out that the AUI is not defined as a sublayer.
Change from:
"When the client sublayer is an xAUI-n, each instance of tx_symbol and rx_symbol takes on one of four values... "
To:
"When there is an xAUI-n above the PMA, each instance of tx_symbol and rx_symbol takes on one of four values "

Additionally, there are other instances in Clause 176 where an AUI is referred to as a sublayer.
- 176.3, Page 307, Line 38
- Fig 176-2, footnotes c and d.

Make changes to all instances in Clause 176 where an AUI is referred to as a sublayer.
Implement with editorial license.

*Cl* **176** *SC* **176.4.2** *P* **311** *L* **10** # 283

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

The AMs provide both the RS FEC symbol boundary and the RS FEC codeword boundary

*SuggestedRemedy*

Change the beginning of the 3rd sentence from:
"This also identifies the RS-FEC symbol boundary and allows the PCSLs to then be deskewed and aligned to a multiple-symbol or codeword boundary."
to
"This also identifies the RS-FEC symbol boundary and RS-FEC codeword boundary and allows the PCSLs to then be deskewed and aligned to a multiple-symbol or codeword boundary..."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

*Cl* **176** *SC* **176.4.2.3.1** *P* **312** *L* **1** # 284

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(bucketp) (L)*

The 4-codeword deskew contains additional text about how much skew is left after 4 CW deskew is complete. That would seem to obvious - iby definition, it's an integer multiple of 4 CW, since that is what the process says must be done. By comparison, the 20 bit and 40 bit deskew description doesn't have similar information about remaining skew.

*SuggestedRemedy*

Delete the paragraph starting with "After the 4-codeword deskew is complete, the remaining inter-lane skew.", the two dashed list items below it, and the NOTE (it should be obvious that zero is an integer, so a full deskew would be compliant with a deskew to 4 CW boundaries, in the same way that is obvious for the 20-bit and 40-bit deskews).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The paragraph provides the allowed values of inter-lane skew between PCS lanes, for the 200Gb/s and 400Gb/s data rates. Having this additinal detail does not hurt even though it may seem obvious. Similarly, the note that explictly states that a remaining skew of zero satsifies the requirement of the 4-codeword deskew function, is good to have, since some implementations may prefer to perform a full deskew as opposed to deskewing to the closest 4-codeword boundary.

In summary, this paragraph provides additional explanation which will help the reader understand the function better, and there is insufficient justification to deleting it. In fact, further clarification would be useful.

Change the first sentense of the 3rd paragraph of 176.4.2.3.1
From:
"After the 4-codeword deskew is complete, the remaining inter-lane skew between the alignment markers of the PCSLs is in multiples of four codewords as shown below, where N is an integer:"
To:
"Since RS-FEC codewords are distributed across PCSLs, after the 4-codeword deskew is complete, the remaining inter-lane skew between the alignment markers of the PCSLs is in multiples of four codewords as shown below, where N is an integer:"

Implement with editorial license.

*Cl* **176** *SC* **176.4.4.2.1** *P* **320** *L* **54** # 75

Wienckowski, Natalie — IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Update the definition of reset to keep it consistent with comments #74 - reset is a special case.
Modify the definition of the reset variable by adding: ", and is false otherwise." to end of the last sentence.
Implement with editorial license.

*Cl* **176** *SC* **176.4.4.2.1** *P* **321** *L* **7** # 76

Wienckowski, Natalie — IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Update the definition of the align_status_mux variable from:
"Boolean variable that is set to true when PCS lane synchronization is complete. It indicates that all_locked_mux is true and deskew is complete."
To:
"Boolean variable that indicates the alignment marker lock and deskew processes are complete. Its value is set by the PMA multiplex synchronization state diagram (see Figure 176-10)."
Implement with editorial license.

*Cl* **176** *SC* **176.4.4.2.1** *P* **321** *L* **21** # 77

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Update the definition of the pcs_lanes_identified_mux variable from:
"Boolean variable that is set to true if each input lane is locked to a unique alignment marker sequence identified using the alignment markers in Table 119-1 for 200GBASE-R, Table 119-2 for 400GBASE-R, Table 172-2 and Table 172-3 for 800GBASE-R, or Table 175-2 for 1.6TBASE-R PMAs."
To:
"Boolean variable that is set to true if each input PCS lane is locked to a unique alignment marker sequence identified using the alignment markers in Table 119-1 for 200GBASE-R, Table 119-2 for 400GBASE-R, Table 172-2 and Table 172-3 for 800GBASE-R, or Table 175-2 for 1.6TBASE-R PMAs. It is set to false upon entering the LOSS_OF_ALIGNMENT state in the PMA multiplex synchronization state diagram (see Figure 176-10)."
Implement with editorial license.

*Cl* **176** *SC* **176.4.4.2.1** *P* **321** *L* **42** # 78

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of all_locked_demux from:
"Boolean variable that is set to true when pmal_locked_demux<y> is true for all y. For y = 0 to (n-1)."
To:
"Boolean variable is set to true when pmal_locked_demux<y> is true for all y, where y = 0 to (n-1), which indicates all PCS lanes within all PMA lanes have achieved alignment marker lock. Otherwise, this variable is set to false."
Implement with editorial license.

*Cl* **176** *SC* **176.4.4.2.1** *P* **321** *L* **48** # 79

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definitiion of pcs_lanes_identified_demux
From:
"Boolean variable that is set to true if all demultiplexed PCS lanes are locked to a unique alignment marker sequence identified using the alignment markers in Table 119-1 for 200GBASE-R, Table 119-2 for 400GBASE-R, Table 172-2 and Table 172-3 for 800GBASE-R, or Table 175-2 for 1.6TBASE-R PMAs."
To:
"Boolean variable that is set to true if all demultiplexed PCS lanes are locked to a unique alignment marker sequence identified using the alignment markers in Table 119-1 for 200GBASE-R, Table 119-2 for 400GBASE-R, Table 172-2 and Table 172-3 for 800GBASE-R, or Table 175-2 for 1.6TBASE-R PMAs. It is set to false upon entering the LOSS_OF_SYMBOL_LOCK state in the PMA demultiplex symbol lock state diagram (see Figure 176-11)."

*Cl* **176** *SC* **176.4.4.2.1** *P* **321** *L* **52** # 80

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definiintion of pmal_locked_demux<y>
From:
"Boolean variable that is set to true when amps_lock<x> is true, as defined in 119.2.6.2.2, for all PCSLs within the single input lane in the demultiplexing direction. For y = 0 to (n-1)"
To:
"Boolean variable that is set to true when amps_lock<x> is true, as defined in 119.2.6.2.2, for all PCSLs within the single input PMA lane y in the demultiplexing direction, and is set to false otherwise. For y = 0 to (n-1)."
Implement with editorial license.

*Cl* **176** *SC* **176.4.4.2.1** *P* **322** *L* **5** # 81

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
This variable definition actually explains how the restart_lock variable in Fig. 119-12 gets replaced by the restart_lock_demux<y> variable for use in the CL 176 data flow. This is already explained in 176.4.3.2.3.
Remove restart_lock from the state diagram variable definitions in 176.4.4.2.1.
Remove similar redundant definition of restart_lock in the multiplexing direction in 176.4.4.2.1 and add a description of restart_lock for the multiplexing direction in 176.4.2.2 similar to the description in 176.4.3.2.3.
Implement with editorial license.

*Cl* **176** *SC* **176.4.4.2.1** *P* **322** *L* **10** # 82

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of restart_lock_demux<y>
From:
"Boolean variable that is set to true in the SYMBOL_LOCK_RESTART and SLIP_CONTROL states to restart the alignment marker lock processes for the PCSLs within a single input lane in the demultiplexing direction. For y = 0 to (n-1)."
To:
"Boolean variable that is used to restart the alignment marker lock processes for the PCSLs within the single input lane y in the demultiplexing direction, where y = 0 to (n-1). Its value is set by the PMA demultiplex symbol lock state diagram (see Figure 176-11)."
Implement with editorial license.

*Cl* **176** *SC* **176.4.4.2.1** *P* **322** *L* **17** # 83

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to true or false. There is just a description of the use.

*SuggestedRemedy*

Change: For y = 0 to (n-1).
To: It is set to true for y = 0 to (n-1). Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of symbol_lock_counter_demux<y>
From:
"Boolean variable that indicates that the symbol_lock_counter_demux<y> has reached its terminal count. For y = 0 to (n-1).",
To:
"Boolean variable that is set to true when the counter symbol_lock_counter_demux<y> has reached its terminal count, and is set to false when starting the counter (see figure 176-11). For y = 0 to (n-1)."

Implement with editorial license.

*Cl* **176** *SC* **176.12** *P* **337** *L* **3** # 64

Brown, Matt Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) PICS (L)*

Per editor's note, the PICS is incomplete.

*SuggestedRemedy*

Complete the PICS with editorial license and delete editor's note.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with consideration of the resolution to comment #376 which suggests removing most of the PICS content.

*Cl* **176C** *SC* **176C.3** *P* **766** *L* **47** # 214

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *Functional specifications (E)*

The paragraph intends to make the specifications in 178.8 as normative requirements for this annex, but the wording is rather weak. It is not clear that this is infact the intent. Also, the NOTE1 below is elaborating on normative requirements and thus should not be an informative note or should be rewritten as such. The reference to functional specifications should be more assertive like the way the electrical characterics are summarized later in the subclause.
This applies to similar text in 176D.3.

*SuggestedRemedy*

Replace the paragraphs and NOTE from line 46 to line 52 with the following:
"An n-lane C2C component is functionally equivalent to a corresponding n-lane PMD specified in Clause 178 using PAM4 signaling at a nominal signaling rate of 106.25 GBd on each lane. Functional requirements for a C2C component are specified in 178.8. Note that the set of functional requirements includes of the inter-sublayer link training (ILT) function as specified in 178.8.9. The service interfaces are defined in 176C.4."
Updated 176D.1 similarly.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The functional specifications need to state clearly and normatively that a C2C component is functionally equivalent to a PMD, but with different electrical specifications.
The existing NOTEs should be kept as additional guidance to the reader.
Other text in this subclause is a remnant of older C2C annexes and should not appear in the functional specification subclause.

Implement the following changes in 176C.3:
Change the third paragraph to:
"An n-lane C2C component shall be functionally equivalent to a corresponding n-lane PMD specified in Clause 178, and meet the requirements in 178.8, unless stated otherwise."
Delete the fifth paragraph (starting with "Each lane consists of one differential transmission line").
Add a reference to the channel specification in 176C.7.

Implement the corresponding changes in 176D.3.
Implement with editorial license.

*Cl* **176C** *SC* **176C.3** *P* **767** *L* **38** # 215

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *AC coupling (E)*

The C2C channel is defined from TP0 to TP5 as shown in the block diagram above and stated in 176C.7. Furthermore, this informative note is rather normatively stated; for this a footnote, rather than note is required. Also, per 176C.7.5 we might infer that AC-coupling may be anywhere on the TP0d to TP5d channel.
Per style manual:
"Normative text (information required to implement the standard)"
"a note to a figure is informative; a footnote to a figure is normative"
"Footnotes to figures may contain normative information. They should be marked with lowercase letters starting with "a" for each figure."
Since the information in the note is provided elsewhere, perhaps it might be better to just delete this note rather than repeating. A similar note is not used in Figure 178-2.

*SuggestedRemedy*

Change NOTE 2 to a figure footnote a.
Add the "a" superscript to the end of "C2C Channel" in the diagram.
Change the footnote text to: "The C2C channel is defined between TP0 and TP5 including the connector (see 176C.7). The AC-coupling is included either in the C2C channel or in the device package (see 176C.7.5). The connector in the channel is optional."
Alternately, delete NOTE 2.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

The statement in NOTE 2 that "The C2C channel is defined between TP0d and TP5d" contradicts the figure content and the text in 176C.7, which both define the channel as TP0 to TP5.
The statement that the connector is optional does not appear in similar figures in previous C2C annexes, nor in KR link diagrams.
Thus, NOTE 2 can be deleted.

AC coupling (mentioned in the comment) is specified in a normative subclause 176C.7.5, and there is no need to add a normative figure footnote (which is uncommon).

Delete NOTE 2, and change "NOTE 3" to "NOTE 2".

*Cl* **176C** *SC* **176C.4** *P* **768** *L* **1** # 355

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **R** *Service interfaces (E)*

"The service interface above and below the 200 Gb/s per lane AUI-C2C is the PMA service interface as specified in 176.2." How can there be a PMA service interface above the AUI, which connect to the bottom of a PMA sublayer? The PMA service interface is at the top of the PMA sublayer, not the bottom of it. Is the PMA sublayer a client of the AUI?

*SuggestedRemedy*

Please clarify.

*Response* *Response Status* **U**

REJECT.
The AUI-C2C link serves as a physical instantiation of the PMA service interface. The PMA service interface is an instance of the inter-sublayer service interface, and the interface above the PMA and below the PMA are the same. See, for example, 176.2.

The comment does not provide an actionable suggested remedy.

*Cl* **176C** *SC* **176C.6.3** *P* **770** *L* **31** # 261

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *mode conversion (E)*

There appears to be little connection between the
Common-mode to differential-mode return loss, RLdc mask
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 176C-2

*SuggestedRemedy*

Remove row for
Common-mode to differential-mode return loss, RLdc (min)
Remove sections
176C.6.3.7 Transmitter common-mode to differential-mode return loss
Add 3 rows to Table 176C-2
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **176c** *SC* **176c.6.3.7** *P* **771** *L* **52** # 346

Simms, William — NVIDIA

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

RLcd is defined but RLdc is used for equation and plot

*SuggestedRemedy*

Change RLcd to RLdc in the definition

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #344

*Cl* **176C** *SC* **176C.6.4** *P* **773** *L* **1** # 195

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **R** *Signal Detect (E)*

Annex 178B section 178B.6 refers to a signal detect function in AUI components. This function is missing from Annex 176C and Annex 176D.

*SuggestedRemedy*

Add a SIGNAL DETECT function to Annex 176C and 176D or define that ILT is supported for 200G based AUIs only.

*Response* *Response Status* **U**

REJECT.
176C.3 states that a C2C component is functionally equivalent to a corresponding PMD specified in 178 with explicit reference to 178.8, which includes the signal detect function (178.8.4). Additionally NOTE 1 in 176C.3 emphasizes that C2C components include the ILT function for a type E1 interface with explicit reference to Annex 178B.

There is no consensus to make the suggested change.

*Cl* **176C** *SC* **176C.6.4** *P* **773** *L* **13** # 262

Mellitz, Richard Samtec

*Comment Type* **TR** *Comment Status* **R** *mode conversion (E)*

There appears to be little connection between the
Differential-mode to common-mode return loss, RLcd mask
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 176C-4

*SuggestedRemedy*

Remove row for in table 176C-4: "Differential-mode to common-mode return loss, RLcd"
and remove section: 176C.6.4.4 Receiver differential-mode to common-mode return loss
Add 3 rows to Table 176C-4
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **176C** *SC* **176C.6.4.2** *P* **773** *L* **28** # 440

Dudek, Mike Marvell

*Comment Type* **TR** *Comment Status* **A** *RX test channel IL (E)*

This comment is related to unsatisfied comment #535 to D2.0. Inserting the the minimum channel loss from the KR interference tolerance test (14.5dB) between the Tx and Rx does not adequately test the overload for C2C where much lower minimum losses are expected. (The minimum loss is presently not specified for C2C. Assuming that the pattern generator used in the overload test has a similar loss to a minimum loss real package the loss should be equal to the minimum loss in the C2C link. 2dB allowing for a minimum trace length of approx 2 inches with low loss materials seems reasonable.

*SuggestedRemedy*

Change "using a channel with the minimum insertion loss specified in 178.9.3.4" to "using a channel with the recommended minimum insertion loss specified in 176C.7.2. Add another paragraph to 176C.7.2. "The recommended minimum insertion loss for the channel between TP0 and TP5 is 2dB."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #273.

*Cl* **176C** *SC* **176C.6.4.5.3** *P* **776** *L* **19** # 273

Kutscher, Noam Marvell

*Comment Type* **T** *Comment Status* **A** *RX test channel IL (E)*

A nominal 10dB low-loss ITOL IL value cannot be achieved with a high-radix device.

*SuggestedRemedy*

Correct the value to 15dB.
Reasoning for the new range: Simple Loss Calculation-
a. ~1.5' escaping = ~1.8dB
b. 2 X Via = ~2dB
c. PCB- 3inch = ~3.6dB
d. SMA = ~0.5dB
e. Coupler = 3dB
f. Cable to ISI PCB ~30cm = ~2dB
Total estimated loss ~12.9dB - change to 15dB.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The values in D2.1 were established by the response to C#553 against D1.3. See <https://www.ieee802.org/3/dj/comments/D1p3/8023dj_D1p3_comments_final_id.pdf#page=131> and the referenced <https://ieee802.org/3/dj/public/25_01/heck_3dj_01b_2501.pdf#page=11>, which is based on contributed channels.

The CRG reviewed slides 20-22 in <https://ieee802.org/3/dj/public/25_09/ran_3dj_01b_2509.pdf>.
In the CRG discussion there was general support for option 3 on slide 22.

Implement option 3 on slide 22, in both annex 176C and clause 178, with editorial license.

*Cl* **176C** *SC* **176C.6.4.6** *P* **776** *L* **33** # 306

Healey, Adam — Broadcom, Inc.

*Comment Type* **TR** *Comment Status* **A** *(bucket) RX JTOL (E)*

The jitter tolerance test procedure defined in Annex 176C is not consistent with the test procedure defined in Clause 178. There is no obvious reason why the test procedures should differ.

*SuggestedRemedy*

Align the jitter tolerance test procedure defined in 176C.6.4.6 with the jitter tolerance test procedure defined in 178.9.3.5.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
The addition of additive broad-band noise to calibrate COM in the jitter tolerance test (comment #496 against D2.0, see <https://www.ieee802.org/3/dj/comments/D2p0/8023dj_D2p0_comments_final_id.pdf#page=129>) was implemented in clause 178 but not in the other clasues, although that was obviously the intent.

Apply changes corresponding to the resolution of comment #496 in clause 179, annex 176C, and annex 176D.
Implement with editorial license.

*Cl* **176C** *SC* **176C.6.4.6** *P* **776** *L* **40** # 156

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *RX JTOL PPM (E)*

Jitter tolerance test must be performed at max PPM offset

*SuggestedRemedy*

Add followig sentence:
JTOL generator must be at +/-50 PPM from the receiver under test.

*Response* *Response Status* **C**

REJECT.
The requirement to meet jitter tolerance (and other receiver specifications) across the specified frequency range is stated in 176C.6.4.1.

*Cl* **176C** *SC* **176C.7** *P* **777** *L* **17** # 264

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *mode conversion (E)*

There appears to be little connection between the
Differential-mode to common-mode return loss, RLcd mask
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 176C-6

*SuggestedRemedy*

In table 176C-6 Remove row for "Differential-mode to common-mode return loss, RLcd"
and remove section: 176C.7.4 Channel differential-mode to common-mode return loss
Add 3 rows to Table 176C-6
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **176C** *SC* **176C.7** *P* **777** *L* **18** # 263

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *mode conversion (E)*

In Table 176C-6, the rows labeled:
Differential-mode to common-mode insertion loss (ILcd) and
Common-mode to differential-mode insertion loss (ILdc)
appear to describe a impairments already captured by the SCMR_CH metric. Both are like SNR as the delta is like an SNR.
In addition, there appears to be little connection between the ILcd and ILdc masks and link performance, as small excursions beyond the mask may show negligible impact.

*SuggestedRemedy*

In Table 176C-6: Remove rows for:
Differential-mode to common-mode insertion loss, ILcd
Common-mode to differential-mode insertion loss, ILdc
add row
SCMR_CH (min) = 20 dB
SCMR_DC_CH (min) = 20 dB

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #260.

*Cl* **176C** *SC* **176C.7** *P* **778** *L* **23** # 411

Ran, Adee Cisco Systems

*Comment Type* **T** *Comment Status* **A** *mode conversion (E)*

In Table 176C-6 there is no specification of SCMR_CH, unlike the corresponding Table 178-11.
There is no reason to have this specification in one case and not in the other.

*SuggestedRemedy*

Add a row for SCMR_CH (min), with reference to 179.11.8 (or another place if the location of the definition changes), and a value of 20 dB.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #260.

*Cl* **176C** *SC* **176C.7** *P* **781** *L* **17** # 413

Ran, Adee Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

The references for RLcd and for maximum AC-coupling frequency point to 176C.7.4 and 176C.7.5, which in turn point to subclauses of clause 178 with no modification.
There are other references pointing directly to clause 178. The chain of references can be eliminated here too.
(ILdd and ERL are exceptions; these specifications have different values or parameters).

*SuggestedRemedy*

Replace the references in these rows to point directly at the specifications in clause 178, and delete the subclauses in this annex.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176C** *SC* **176C.7.3** *P* **781** *L* **1** # 412

Ran, Adee Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

Stray space in "an d"

*SuggestedRemedy*

Change to "and".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176D** *SC* **176D.6.1** *P* **790** *L* **11** # 150

Ghiasi, Ali Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(bucketp) Figure labels (E)*

Lable for the DC blocks are missing

*SuggestedRemedy*

Add capacitor or DC blocks on the figrue 176D-5

*Response* *Response Status* **W**

REJECT.
The purpose of the figure is to illustrate the test points. Unnecessary details would reduce the clarity of the figure.
Similar figures exist in previous AUI-C2M annexes (see Figure 83E-2 as an initial example, which many similar figures are based on, and the more recent Figure 120G-2 and Figure 120G-4), and do not include labels for the capacitors.
It is assumed that readers are familiar with the symbolic representation of a capacitor, so adding labels as suggested would not improve the clarity of the document.

*Cl* **176D** *SC* **176D.6.4** *P* **790** *L* **47** # 3

Brown, Matt Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

Editor's note expire's after Draft 2.1.

*SuggestedRemedy*

Delete editor's note.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176D** *SC* **176D.6.4** *P* **791** *L* **12** # 265

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

There appears to be little connection between the
Common-mode to common-mode return loss, RLcc(min)" and "Common-mode to differential-mode return loss, RLdc (min) masks
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 176D-2

*SuggestedRemedy*

Remove rows for
Common-mode to common-mode return loss, RLcc(min)
Common-mode to differential-mode return loss, RLdc (min)
Remove section
176D.8.3 Return loss specifications
Add 3 rows to 176D-2
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **176D** *SC* **176D.6.4** *P* **791** *L* **36** # 297

Rysin, Alexander — NVIDIA

*Comment Type* **T** *Comment Status* **R** *Jitter (E)*

J4u measurements at TP1a are highly affected by the effects of slew rate and noise and do not reflect actual uncorrelated jitter. These effects are exacerbated by the characteristics of practical channels between TP0d and TP1a - loss and reflections, and are highly dependent on the transmitted signal amplitude. Accounting only for the faster edges does not work for practical channels at 106.25 Gbd rate and the currently proposed numbers cannot be met (and sometimes cannot be measured) even with commercial test equipment PPG. The issue was demonstrated in rysin_3dj_01a_2407. A new method for JRMS, that largely resolves the demonstrated issue was adopted, yet J4u was not resolved. A different methodology that will better quantify phase-only uncorrelated jitter has to be explored.

*SuggestedRemedy*

Other method of uncorrelated total jitter measurement, that provides a better estimation of the horizontal only jitter, while eliminating the effects of vertical noise, including test equipment noise, should be considered.

*Response* *Response Status* **C**

REJECT.
The suggested remedy does not provide sufficient detail to implement.

*Cl* **176D** *SC* **176D.6.4** *P* **791** *L* **39** # 4

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

Editor's note expire's after Draft 2.1.

*SuggestedRemedy*

Delete editor's note.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176D** *SC* **176D.6.5** *P* **791** *L* **32** # 151

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *Tx specifications (E)*

SNDR min for Preset 2 is 27.5 dB, how can SNR_ISI be 26 dB

*SuggestedRemedy*

If we just want to have single SNR_ISI, seems 27.5 dB would be a better choice

*Response* *Response Status* **W**

REJECT.
SNDR and SNR_ISI are different specifications and their values are not dependent. The effects measured by SNR_ISI (ISI) are especially excluded from the SNDR measurement.

*Cl* **176D** *SC* **176D.6.5** *P* **792** *L* **5** # 5

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

Editor's note expire's after Draft 2.1.

*SuggestedRemedy*

Delete editor's note.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176D** *SC* **176D.6.5** *P* **792** *L* **25** # 266

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

There appears to be little connection between the
Common-mode to common-mode return loss, RLcc(min)" and "Common-mode to differential-mode return loss, RLdc (min) masks
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 176D-3

*SuggestedRemedy*

Common-mode to common-mode return loss, RLcc(min)
Common-mode to differential-mode return loss, RLdc (min)
Remove section
176D.8.3 Return loss specifications
Add 3 rows to 176D-3
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **176D** *SC* **176D.6.6** *P* **793** *L* **16** # 267

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

There appears to be little connection between the
Differential-mode to common-mode return loss, RLcd mask
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 176D-4

*SuggestedRemedy*

Remove row for
" Differential-mode to common-mode return loss, RLcd (min)
Remove section
176D.8.3 Return loss specifications
Add 3 rows to Table 176D-4
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **176D** *SC* **176D.6.7** *P* **793** *L* **36** # 441

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *Test points (E)*

This comment is related to unsatisfied comment #505 to D2.0. The response to that comment removed the location of where the specifications should be met. Unfortunately not all the individual test sections state where the specifications should be met.

*SuggestedRemedy*

Add a sentence above the table "These specifications are to be met at TP1 unless stated otherwise". If this is not done then in 176D.8.3 change "module input" to "module input at TP1" and in 176D.8.2 add a sentence "for the module input the ERL is defined at TP1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Apparently all module input specifications are measured or calibrated at the MCB input (TP1), with the possible exception of "Amplitude tolerance" (which is currently measured at the test transmitter output, but could also be measured at TP1, assuming the mesaured v_f is not significantly affected by the loss of the frequency-dependent attenuator).
It is preferable to match the title of Table 176D-4.

Change the title of Table 176D-5 to "Summary of module input specifications at TP1".
In footnote a (addressing steady-state voltage), change from
"Specified as the steady-state voltage (as defined in 176D.8.4) measured at the test transmitter's output."
to
"Specified as the steady-state voltage (as defined in 176D.8.4) of the test transmitter, measured at TP1".

For consistency, in footnote a of Table 176D-4, change from
"Specified as the steady-state voltage (as defined in 176D.8.4) measured at the test transmitter's output"
to
"Specified as the steady-state voltage (as defined in 176D.8.4) of the test transmitter, measured at TP4a".

*Cl* **176D** *SC* **176D.6.7** *P* **793** *L* **47** # 268

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

There appears to be little connection between the
Differential-mode to common-mode return loss, RLcd mask
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 176D-5

*SuggestedRemedy*

Remove row for
" Differential-mode to common-mode return loss, RLcd (min)
Remove section
176D.8.3 Return loss specifications
Add 3 rows to Table 176D-5
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **176D** *SC* **176D.7.1** *P* **794** *L* # 216

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *Test points (E)*

TP0d, TP1d, TP4d, TP5d are undefined in 176D. Also, the COM model includes assumptions above a device (die) and the related package, identifying different loss classes based on the package. Thus there is a conscious recognition of the device and device package in the specifications, though indirect.

*SuggestedRemedy*

Within this figure (or a new complementary figure) provide illustrations of the device, package, and the interfaces between the device and package, etc., as is done in Figure 178-2, Figure 178-3, and Figure 178-5. As a minimum define TPxd.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment identifies a gap in the draft, lack of definition of test points in the figure (in the context of Annex 176D).
The device package is included in the reference model, but is not otherwise specified (e.g. there is no "package class" or "host class" in Annex 176D that an implementation has to comply with).
The suggested illustrations based on figures in Clause 178 are not suitable for this annex, since here the channel is not symmetric, and the test points TP0 and TP5 are not used. It is unclear what changes would satisfy this part of the comment. A detailed proposal is encouraged.
However, definitions of TP0d, TP1d, TP4d, and TP5d are required.

The CRG has reviewed the proposal on slide 4-5 of <https://www.ieee802.org/3/dj/public/25_09/ran_3dj_01b_2509.pdf>.

Implement the changes shown on slide 5 of ran_3dj_01b_2509.pdf, with editorial license.

*Cl* **176D** *SC* **176D.7.1** *P* **794** *L* **21** # 310

Healey, Adam — Broadcom, Inc.

*Comment Type* **E** *Comment Status* **A** *(bucket) Figure labels (E)*

The term "die-to-die channels" is used but the term "die" is not in IEEE Std 802.3 (or in the IEEE P802.3dj draft). "Device" has been used instead e.g., in the Channel Operating Margin reference model.

*SuggestedRemedy*

Change "die-to-die channels" to "device-to-device channels". Make the same change in Figure 176D-6.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
"Device-to-Device channel" has not been used anywhere in 802.3 or in presentations. The editor suspects that this term would be more confusing that "die-to-die".
However, the terms "die-to-die" and "end-to-end" that appear in 176D.7 and subclause can be made more specific, using the named test points.

In the first sentence of 176D.7, change from "the channel between the C2M components is not specified from end to end" to "the channel between the C2M components is not specified".
In 176D.7.1, change "The insertion loss of the host, module, and die-to-die channels is not expected to be measurable" to "The insertion losses of the host channel, the module channel, and the TP0d-TP1d and TP4d-TP5d channels are not expected to be measurable".
In Figure 176D-6, change the label "Die-to-die" to "TP0d-TP1d and TP4d-TP5d".
Implement with editorial license.

*Cl* **176D** *SC* **176D.7.1** *P* **794** *L* **25** # 275

Kutscher, Noam — Marvell

*Comment Type* **T** *Comment Status* **R** *(bucket) Figure labels (E)*

The point in the center is not well defined. What is it? cage? HCB?

*SuggestedRemedy*

Add an explanation of the location to which the arrows point.

*Response* *Response Status* **C**

REJECT.
The NOTE at the bottom of the figure states "For loss budgeting purposes, the connector is considered part of the host". The arrows representing the channels indicate that; the connector (labeled) is within the host channel.
As noted in the subclause text, these losses are not expected to be measurable.
It is not clear whether additional explanation is necessary, and what it should be.
The suggested remedy does not provide sufficient detail to implement.

*Cl* **176D** *SC* **176D.7.1** *P* **794** *L* **26** # 353

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **R** *ILdd budget (E)*

As shown, the Figure 176D-6 is inconsistent with Figure 179A-1, which shows 3.8dB for the HCB from a point just past the mated connector to the RF connector. But Figure 176D-6 shows 3.8dB just past an unmated host connector. In fact the mating part of the connector is not shown, which does not make sense, since you need two parts for the connector. If the intent is to include the module part of the connector in the 3.8dBm, then draw that and change Figure 179A-1. Otherwise, show that the host channel loss includes the mated connector as in the Host Channel shown in Figure 179A-1.

*SuggestedRemedy*

Show that the host channel loss includes the mated connector as in the Host Channel shown in Figure 179A-1.

*Response* *Response Status* **U**

REJECT.
The NOTE at the bottom of Figure 176D-6 states "For loss budgeting purposes, the connector is considered part of the host". The arrows representing the channels indicate that; the connector (labeled) is within the host channel.
In Figure 176D-6 the module channel is allocated 3.8 dB. Figure 179A-1 does not show a module, but it includes an HCB which happens to have the same allocation as a module. The module and the HCB are "edge connectors" (plugs) and the "module part of the connector" is unseparable from the module; the 3.8 dB includes the "edge connector pad" (see 179B.2.1).
Figure 176D-6 is indeed diffferent from Figure 179A-1 (which shows a two-piece connector) but it is intended to show the insertion loss budget, not to illustrate a mechanical structure. It may be possible to improve the diagram, but the suggested remedy is somewhat vague. A detailed proposal that could be reviewed by the CRG is encouraged.

*Cl* **176D** *SC* **176D.8.7** *P* **800** *L* **8** # 276

Kutscher, Noam — Marvell

*Comment Type* **T** *Comment Status* **A** *SNDR (E)*

The measurement equipment is problematic for PRBS31Q calibration.

*SuggestedRemedy*

Rephrase to: "and calibrated at the generator output using PRBS13Q with target maximum steady-state voltage as specified in Table 176D-2 and transition time of 6 ps."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The current text is poorly phrased; the phrase starting with "and calibrated at the generator output" should refer to the pattern genrator that feeds the host inputs, not to the PRBS31Q signals (steady-state voltage is measured with PRBS13Q).

Change from:
SNDR for host output is defined at TP1a and calculated using the method in 179.9.4.5, with the exception that the host inputs at TP4a on each lane are driven by asynchronous signals created by PRBS31Q or PCS data, with transmit equalization (see 176D.8.6) set to preset 1, and calibrated at the generator output with target maximum steady-state voltage as specified in Table 176D-2 and transition time of 6 ps.

To:
SNDR for host output is defined at TP1a and calculated using the method in 179.9.4.5, with the exception that the host inputs at TP4a on each lane are driven by asynchronous signals with transmit equalization (see 176D.8.6) set to preset 1, with the maximum steady-state voltage as specified in Table 176D-2 and transition time of 6 ps. The asynchronous signal pattern is either PRBS31Q or PCS data.

Implement with editorial license.

*Cl* **176D** *SC* **176D.8.12** *P* **801** *L* **10** # 152

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *ITOL (E)*

Interference tolerance is missing Sinusoidal Jiter SJ

*SuggestedRemedy*

Include table 176D-10 in this section and following text to 176D.8.12.2 after C) before D)
Adjust pattern genrator Sinusoidal jitter based on amplitude in table 176D-10.

*Response* *Response Status* **W**

REJECT.
The SJ in Table 176D-10 is included in the jitter tolerance test (176D.8.13).
In the interference tolerance test it is recommended to have jitter that matches the specification limits (see item d in 176D.8.12.2)
Receivers are required to pass both tests.

Note that the JTOL includes additional noise (calibrated using COM), added in Annex 176D by comment #306.
Adding SJ to the ITOL would create duplicate tests.

*Cl* **176D** *SC* **176D.8.12.2** *P* **803** *L* **51** # 153

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *ITOL (E)*

SJ not mentioned in item d)

*SuggestedRemedy*

Add following sentence to d):
Pattern generator jitter may need to be reduced to accommodate 0.05 UI Sinusoidal Jitter (SJ). With SJ at maximum limit J4u03 and JRMS are adjusted as close as practical to their limit.

*Response* *Response Status* **W**

REJECT.
The comment is about interference tolerance test (ITOL).
The combination of jitter sources that achieves the J4u03 and JRMS values, as recommended in item d, is not prescribed in the CR ITOL methodology used here (nor in several other test methods). Test implementers have been capable of finding such combination in past generations.
The suggested remedy refers to "SJ at maximum limit" but there is no such definition.
Note that SJ with specified values is used in the JTOL test.
See also the response to comment #152.

*Cl* **176D** *SC* **176D.8.12.4** *P* **804** *L* **38** # 269

Kutscher, Noam — Marvell

*Comment Type* **T** *Comment Status* **A** *ITOL (E)*

For ease of use and interoperability with additional former tests it is better to add PRBS31Q as well as scrambled idle.

*SuggestedRemedy*

Rephrase to: 'DUT transmit a scrambled idle or PRBS31Q pattern at preset 1'.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The suggested remedy is consistent with previous test methods such as 120G.3.3.5.3 and 120G.3.4.3.3, and with CR host test in 179.9.5.3.5, which specifies that "the transmitters in the device under test transmit the same pattern type specified for the test, with equalization turned off" (the pattern specified in Table 179-12 is PRBS31Q).

Change from "During the test, the transmitters in the DUT transmit a scrambled idle pattern" to "During the test, the transmitters in the DUT transmit either PRBS31Q or scrambled idle".

---

*Cl* **176D** *SC* **176D.8.13.2** *P* **805** *L* **8** # 154

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *JTOL (E)*

Jitter tolerance test must be performed at max PPM offset

*SuggestedRemedy*

Add followig sentence:
JTOL generator must be at +/-50 PPM from the receiver under test.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Any requirement should be in terms of offset from the nominal frequency rather than the frequency of the receiver under test (which is not defined; the receiver has to track the frequency of its input).

The requirement to meet jitter tolerance at the frequency range is implied by the "Signaling rate (range)" row of Tables 176D-4 and 176D-5. However, it would be better to make these requirements more explicit.

Add a "Receiver signaling rate" subclause under 176D.8, with content based on 178.9.3.2. Add references to this new sucblause in Tables 176D-4 and 176D-5.

Implement with editorial license.

---

*Cl* **176D** *SC* **176D.8.13.2** *P* **805** *L* **23** # 307

Healey, Adam — Broadcom, Inc.

*Comment Type* **TR** *Comment Status* **A** *(bucket) ITOL/JTOL (E)*

The first sentence of the note below Table 176D-10 states the following. "For a module input test, ADD and sigmaRJ calculated from pattern generator measurements using Equation (179-14) and Equation (179-15) can be higher than the values in Table 176D-7. In this case, a suitable channel should be chosen in order to meet the COM requirement with these higher values." This suggests that a receiver is permitted to be tested with a transmitter that is far outside the limits imposed on compliant transmitters. It also relies on the Channel Operating Margin (COM) calculation being able to correctly evaluate the penalty caused by transmitters with high jitter. The COM calcuation uses a first-order approximation of the noise due to transmitter jitter and the accuracy of this approximation can be expected to degrade for higher levels of jitter. Therefore, it seems likely trade-offs between channel loss/noise and jitter may not a evaluated accurately. The test transmitter, including the added sinusoidal jitter, should be required to meet the JRMS and Jnu03 specifications or the degree to which the test transmitter is allowed to exceed the specifications should be limited.

*SuggestedRemedy*

Remove the first sentence of the note. The requirements of 176D.8.12.2 (referred to by 176D.8.13.2) item d) are then expected to apply.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #308.

---

*Cl* **176D** *SC* **176D.9** *P* **806** *L* **8** # 2

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *PICS (E)*

Per editor's note, the PICS is incomplete.

*SuggestedRemedy*

Complete the PICS with editorial license and delete editor's note.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.1.1** *P* **339** *L* **12** # 189

Bruckman, Leon Nvidia

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

Text can be simplified. As an example see similar text in 176.1.1

*SuggestedRemedy*

Change: "When necessary for disambiguation, to differentiate the Inner FEC defined in this clause"
To: "When necessary to differentiate the Inner FEC defined in this clause"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #504

*Cl* **177** *SC* **177.1.1** *P* **388** *L* **13** # 504

Opsasnick, Eugene Broadcom

*Comment Type* **ER** *Comment Status* **A** *(bucket) (L)*

Redundant language should be simplified.

*SuggestedRemedy*

Change:
"When necessary for disambiguation, to differentiate the Inner FEC defined in this clause from the 800GBASE-LR1 Inner FEC defined in Clause 184, the terms ..."
To:
""When necessary to differentiate the Inner FEC defined in this clause from the 800GBASE-LR1 Inner FEC defined in Clause 184, the terms ..."

*Response* *Response Status* **W**

ACCEPT.

*Cl* **177** *SC* **177.1.3** *P* **339** *L* **12** # 506

Opsasnick, Eugene Broadcom

*Comment Type* **ER** *Comment Status* **A** *(bucket) (L)*

Missing comma and article

*SuggestedRemedy*

Change:
"Per Inner FEC flow binary(128,120) encoding and decoding"
To:
"Per Inner FEC flow, a binary(128,120) encoding and decoding"

*Response* *Response Status* **W**

ACCEPT.

*Cl* **177** *SC* **177.1.4** *P* **340** *L* **28** # 285

Huber, Thomas Nokia

*Comment Type* **ER** *Comment Status* **A** *(bucket) (L)*

No need to describe the pad as "8x128b" in Figure 177-2. The details of how the pad is constructed are in 177.4.7, which is titled "Pad insertion and format".

*SuggestedRemedy*

Change the label from "8x128b pad insertion" to "Pad insertion" Make the same change in figure 177A-1.

*Response* *Response Status* **W**

ACCEPT.

*Cl* **177** *SC* **177.2** *P* **341** *L* **24** # 508

Opsasnick, Eugene Broadcom

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

The cross-referece to Figure 177-2 in this paragraph is out of place, especially since the paragraph prior to it describes at the same client interface which are illustrated in the same figure without a cross-reference.

*SuggestedRemedy*

Remove "(see Figure 177-2)" from the line 24.

At line 4 of page 341, just prior to "The service interface primitives are summarized as follows:", add a single sentence paragraph that reads:
"The Inner FEC service interfaces is illustrated in Figure 177-2..

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

*Cl* **177** *SC* **177.4.5** *P* **346** *L* **32** # 495

Slavick, Jeff Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

There are two instances of "dot" matrix. Lets make sure both a referred to.

*SuggestedRemedy*

Change "where the "*" denotes a matrix dot multiplicaiton."
To: "where the "*" denotes matrix dot multiplication in the preceding equation and in Eq 177-4"

*Response* *Response Status* **W**

ACCEPT.

*Cl* **177** *SC* **177.4.5** *P* **347** *L* **5** # 494

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

I've not heard of an inversion operation for a matrix. I know what the inverse of a matrix is. Should also make sure this explanation is relevant just to Eq 177-5

*SuggestedRemedy*

Change "The superscript "-1" denotes a matrix inversion operation."
To:
The superscript "-1" denotes the inverse of the matrix in Eq 177-5.
Or:
The superscript "-1" in Eq 177-5 is the notation for taking the inverse of the matrix.
Or:
delete this sentence entirely since superscript "-1" means "one over the thing" in math notation. So whether this is a number or a matrix it's the same mathematical operation and how can it be mis-interpreted.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Change "The superscript "-1" denotes a matrix inversion operation."
To:
The superscript "-1" denotes the inverse of the matrix in Eq 177-5.

*Cl* **177** *SC* **177.4.7.1** *P* **348** *L* **41** # 496

Slavick, Jeff — Broadcom

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

The description of the FAS could be improved.

*SuggestedRemedy*

Update the section to read as follows: "The Frame Alignment Sequence (FAS) is a fixed pattern that is the first 48-bits transmitted in each pad and enables the receiver to locate the pad. The fixed FAS pattern is as follows with the leftmost bit transmitted first:
01011001 01010010 01100100 10100110 10101101 10011011"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.4.7.2** *P* **348** *L* **48** # 190

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

It will be beneficial to refer to the PRBS13 pattern generator figure in the base standard.

*SuggestedRemedy*

Change: "using a self-synchronizing PRBS13 scrambler using the same polynomial as Equation (94-3)."
To: "using a self-synchronizing PRBS13 scrambler as shown in Figure 94-6 and using the polynomial defined in Equation (94-3)."

*Response* *Response Status* **W**

ACCEPT.

*Cl* **177** *SC* **177.5.2** *P* **350** *L* **36** # 191

Bruckman, Leon — Nvidia

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

Pad identification and removal is described in the next sectio. It will be useful to refer to it.

*SuggestedRemedy*

Change: "removed before the received data is processed further."
To: "removed before the received data is processed further (see 177.5.3)."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.6.1.4** *P* **354** *L* **6** # 454

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **R** *Test patterns (L)*

PRBS31Q and PRBS13Q should be defined in the same manner. Note that 802.3df added precoding support for PRBS31Q into Clause 120

*SuggestedRemedy*

Remove 1776.1.2

Change the definition of PRBS31Q to be "The Inner FEC shall include a PRBS31Q test-pattern generator, as specified in 120.5.11.2.2."

In Figure 177-1 remove the PRBS31 from the Tx path (pg 340, line 31) and add PRBS31Q before PRBS13Q

Remove 177.6.2.1

Change the definition of PRBS31Q test pattern checker to be "The Inner FEC shall include test pattern checkers for PRBS31Q, as specified in 1205.11.2.2, using the hard-decision PAM4 decoder (see 177.5.1)."

*Response* *Response Status* **W**

REJECT.

[Editor's note: The subclause of the comment has been corrected from 177.6.21.4 to 177.6.1.4]

The comment is asking to remove the PRBS31 generator/checker in the suggested remedy so only PRBS31Q is supported by removing subclauses 177.6.1.2 and 177.6.2.2, and then to also update Figure 177-2 to show PRBS31Q directly driving the service interface below the Inner FEC.

The PAM4 encoding block includes both Gray mapping and precoding.
The precoding is enabled or disabled based on a request from the peer interface.
Moving the PRBS31Q to after the PAM4 encoder bypasses the precoding.
This arrangement was chosen based on a great deal of consideration and consensus building.

The test pattern generators and checkers were updated in Clause 177 text and in Figure 177-2 according to comments resolved against Draft 1.4. The current draft implements the test pattern generators and checkers as shown in slides 13 and 14 of https://www.ieee802.org/3/dj/public/25_03/brown_3dj_03a_2503.pdf (see comment #123 resolution in https://www.ieee802.org/3/dj/comments/D1p4/8023dj_D1p4_comments_final_id.pdf).

*Cl* **177** *SC* **177.7.2.1** *P* **355** *L* **9** # 84

Wienckowski, Natalie — IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to true or false. There is just a description of the use.

*SuggestedRemedy*

Change: Boolean variable that indicates that fas_cnt has reached its terminal count.
To: Boolean variable that is set to true when fas_cnt has reached its terminal count. Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of fas_cnt_done
From:
"Boolean variable that indicates that fas_cnt has reached its terminal count."
To:
"Boolean variable that is set to true when the counter fas_cnt has reached its terminal count and is set to false when starting the counter (see Figure 177-13)."
Implement with editorial license.

*Cl* **177** *SC* **177.7.2.1** *P* **355** *L* **13** # 85

Wienckowski, Natalie — IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change definition of fas_lock
From:
"A Boolean variable that is set to true when the receiver has detected the location of the frame alignment sequence within the pad codewords."
To:
"A Boolean variable that indicates the receiver has detected the location of the frame alignment sequence within the pad codewords. Its value is set by the Inner FEC pad detection state diagram (see Figure 177-13)."
Implement with editorial license.

*Cl* **177** *SC* **177.7.2.1** *P* **355** *L* **20** # 86

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add to the end of definiton of fas_valid:
"Otherwise, this variable is set to false."
Implement with editorial license.

*Cl* **177** *SC* **177.7.2.1** *P* **355** *L* **29** # 87

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Update the definition of reset to keep it consistent with comments #74 - reset is a special case.
Modify the definition of the reset variable by adding: ", and is false otherwise." to end of the last sentence.
Implement with editorial license.

*Cl* **177** *SC* **177.7.2.1** *P* **355** *L* **33** # 88

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to true or false. There is just a description that says what processes set it.

*SuggestedRemedy*

Add a description of when it is set to true and when it is set to false. There isn't enough information in the spec to provide a suggestion.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the definition of restart_inner_fec_sync
From:
"A Boolean variable that is set by the Inner FEC synchronization process or the Inner FEC pad detection process."
To:
"A Boolean variable that is used to restart all eight self-synchronization processes as well as the pad detection process associated with an input lane in the receive direction. Its value can be set to true in the either the Inner FEC self-synchronization state diagram (see Figure 177-12) or the Inner FEC pad detection state diagram (see Figure 177-13). Its value is set to false upon entering the FAS_LOCK_INIT state of the Inner FEC pad detection state diagram."
Implement with editorial license.

*Cl* **177** *SC* **177.7.2.1** *P* **355** *L* **41** # 89

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of slip_done
From:
"A Boolean variable that is set to true when the SLIP requested by the Inner FEC synchronization state diagram has been completed indicating that the next candidate 128-bit block position can be tested."
To:
"A Boolean variable that indicates the next candidate 128-bit block position can be tested by the Inner FEC self-synchronization process. It is set to true when the SLIP function completes and is set to false upon entering the GET_BLOCK state of the Inner FEC self-synchronization state diagram (see Figure 177-12).
Implement with editorial license.

*Cl* **177** *SC* **177.7.2.1** *P* **355** *L* **45** # 90

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable sync_clow<x>
From:
"A Boolean variable that is set to true after the Inner FEC codeword boundary is found for an Inner FEC flow, where x = 0 to 7, and represents an Inner FEC flow ID before identifying the actual Inner FEC flow numbering."
To:
"A Boolean variable that indicates the Inner FEC codeword boundary is found for an Inner FEC flow, where x = 0 to 7, and x represents an Inner FEC flow ID before identifying the actual Inner FEC flow numbering. The value of sync_flow<x> is set by the Inner FEC self-synchronization state diagram (see Figure 177-12). "
Implement with editorial license.

*Cl* **177** *SC* **177.10** *P* **360** *L* **29** # 286

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

The variables for counting corrected codewords, uncorrected codewords, total bits, and corrected bits (rows 3-TBD) are shared with the ER1 FEC, so they should have more general names.

*SuggestedRemedy*

Change "Inner_FEC_..." to "FEC_..." (see related comment on 45.2.1.258)

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.10** *P* **363** *L* **29** # 287

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

In table 177-8, all of the variables that start with "Inner_FEC_delay." are not aligned with the description in clauses 45.2.1.177a and 45.2.1.177b (or 45.2.1.175 for the ability registers)

*SuggestedRemedy*

Change "Inner_FEC_delay." to "FEC_delay." in the last 12 rows of the table

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.1** *P* **367** *L* **15** # 58

Brown, Matt Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(bucket) (E)*

The word "device" has two meaning in Clause 178. On Page 367 line 15 "device" is packaged part (e.g., die plus the package). On the other hand, on page 373 line 41 the device is something that sits on the package (e.g., die) and the package is separate from the device. The term "device" in the latter context is well embedded so the former context should be given a different term. Subclause 179.11.7.1 uses the term "packaged device".

*SuggestedRemedy*

When referring to a packaged part, use the term "packaged device". Another unique term would be acceptable.
Update 179, 176C, 176D similarly, as necessary.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
In 178.1, change "Devices conform to" to "PMD transmitters and PMD receivers conform to".
Change "between two devices" to "between two PMDs" and similarly in the rest of the sentence.

Elsewhere, change "device" to "PMD" when it refers to a PMD rather than the die inside the package.
Implement with editorial license.

*Cl* **178** *SC* **178.1** *P* **384** *L* **47** # 251

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *(bucket) (E)*

table 178-11 missing reference for SCMR_CH

*SuggestedRemedy*

Add 179.11.8 as the reference

*Response* *Response Status* **W**

ACCEPT.

*Cl* **178** *SC* **178.8.1** *P* **373** *L* **15** # 330

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *titles (E)*

While I agree that "Reference test points" (or "Specified test points" in previous drafts) is a better title for this subclause, I feel that easy navigation of 802.3 comes first. All the other equivalent CR and KR PMD subclauses have the title "Link block diagram".

*SuggestedRemedy*

Rename this subclause to "Link block diagram".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #331.

*Cl* **178** *SC* **178.8.1** *P* **373** *L* **16** # 347

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(bucket) (E)*

The first sentence starts with "The test points are illustrated." This implies that these are the only test points. But additional test points are later defined for compliance testing. This can be confusing.

*SuggestedRemedy*

Change "The test points are illustrated." to "Reference test points are illustrated." Add a sentence after the first sentence that says "Additional test points for compliance measurement are defined in Section 178.9."

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

*Cl* **178** *SC* **178.8.1** *P* **373** *L* **33** # 379

Ran, Adee — Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

"ILT" is a very general term. The block diagram in Figure 178-2 shows the ILT function, part of the PMD functional specification. It would better be labeled "ILT function", to match the other PMD blocks (receive and transmit).
Also in 179.8.1, Figure 179-2.

*SuggestedRemedy*

Change "ILT" to "ILT function", twice, in Figure 178-2 and Figure 179-2.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.8.9** *P* **374** *L* **35** # 333

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

The statement is incomplete (cut-n-paste error).

*SuggestedRemedy*

Replace, "When the variable mr_training_enable is true, the ILT function is used to request changes to the peer transmitter state (modulation, training pattern, and precoder state), control the PMD transmitter output on each lane based on requests from the peer interface."

with

"When the variable mr_training_enable is true, the ILT function is used to request changes to the peer transmitter state (modulation, training pattern, and precoder state), control the PMD transmitter output on each lane based on requests from the peer, indicate the receiver state, and coordinate the transition of the PMD transmit function to DATA mode."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #502.

*Cl* **178** *SC* **178.8.9** *P* **374** *L* **37** # 502

Opsasnick, Eugene — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) ILT (E)*

The statement "When mr_training_enable is false and tx_mode = local_pattern (see 178B.7.3.1), the PMD transmits PRBS31 encoded by Inner FEC (see 177.6.1.1)." is wrong since these -KR interfaces do not use an inner FEC. Subclause 178.8.9 describes the same functionality for a backplane connection as 179.8.9 does correctly for copper cable interfaces. Many of the 178.8.x subclauses currently refer to the definition of the same function in 179.8.x, This can also be done for 178.8.9

*SuggestedRemedy*

Replace all text in 178.8.9 with:
"The PMD inter-sublayer link training function specification is identical to that of 179.8.9."

*Response* *Response Status* **W**

ACCEPT.

*Cl* **178** *SC* **178.9.1** *P* **375** *L* **6** # 380

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **R** *CM reference impedance (E)*

We have adopted a differential impedance target of 92.5 Ohm. However, it does not necessarily mean that the common-mode reference impedance should be a quarter of that; a coupled differential pair that has the target differential impedance may inherently have a higher common-mode impedance.

Since we have common-mode and mode-conversion return loss specifications, they should be referenced to a reasonable target that everyone can design to.

For strongly-coupled striplines the common-mode impedance can be estimated as 0.4 (at least; possibly higher) of the differential impedance; 0.4*92.5=37.

This should apply to all electrical interface (the numbers may differ but in all cases they should be higher than the current value).

*SuggestedRemedy*

Change the reference impedance for common-mode specifications to 37 Ohms.

Apply in 178.9.1, 179.9.1, 176C.6.2, and 176D.6.3.

*Response* *Response Status* **C**

REJECT.
While the comment correctly points out that the common-mode impedance of a transmission line differentail pair is not necessarily equal to one-quarter of the differential impedance, the suggested remedy lacks suffcient rigor to justify the proposed value.
In addition, there are possibly complexities in specifying a reference CM impedance that is different from half of the single-ended impedance.

Additional data and reasoning on this proposal is encouraged.

*Cl* **178** *SC* **178.9.2** *P* **375** *L* **15** # 381

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *est equipment impedance (E)*

Slide 12 of https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01c_2507.pdf (used for resolution of several comments against D2.0) says "Specify that transmitter time-domain measurements are made with a 50 O single-ended load".
This is not stated explicitly in Clause 178, nor in Annex 178C. It is especially important now that the reference impedance is changed.
The text about transmitter measurement should be unified.

*SuggestedRemedy*

In 178.9.2, change the second paragraph to
"Unless specified otherwise, transmitter signal measurements are made for each lane separately using a fourth-order Bessel-Thomson low-pass response with a 3 dB bandwidth of 60 GHz, with AC-coupled connection from TP0v to 50 O single-ended loads in the test equipment."

In 176C.6.3, replace the existing two paragraphs with the three paragraph in 178.9.2, including the change above.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy, and include an additional sentence that applies the same requirements to measurements of pattern generator outputs used to test receivers.
Implement in 178 and 176C with editorial license.

*Cl* **178** *SC* **178.9.2** *P* **375** *L* **36** # 253

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *mode conversion (E)*

There appears to be little connection between the
Common-mode to common-mode return loss, RLcc (min) mask
and link performance, as small excursions beyond the mask may show negligible impact.
See: Table 178-6

*SuggestedRemedy*

Add an appendix titled "Modal ERL and Modal Return Loss" to provide a performance-based alternative to frequency-domain masks.
Modal Return Losses from Single-Ended S-Parameters:
Modal return losses can be derived from a 2-port single-ended S-parameter measurement taken at a test point. The modal components are calculated using the following formulas:
Differential-to-Differential (DD): SDD_11 = RL_DD = (S11 - S12 - S21 + S22) / 2
Common-to-Common (CC): SCC_11 = RL_CC = (S11 + S12 + S21 + S22) / 2
Common-to-Differential (CD): SCD_11 = RL_CD = (S11 - S12 + S21 - S22) / 2
Differential-to-Common (DC): SDC_11 = RL_DC = (S11 + S12 - S21 - S22) / 2
Modal ERL Computation:
The modal Effective Return Loss values-ERL_CC, ERL_CD, and ERL_DC-measured at the test point are computed using the procedure described in IEEE 802.3 Clause 93A.5. The following substitutions and parameters apply:
Replace the scalar return loss term S_ii with the respective modal return loss (RL_CC, RL_CD, RL_DC).
* Use the single-ended reference impedance specified in the referring section or annex (typically 46.25 ohms).
* Set the fixture delay (Tfx) equal to twice the delay from TP0 to TP0v.
* For further details and derivations, refer to the presentation:
https://www.ieee802.org/3/dj/public/adhoc/electrical/25_0828/mellitz_3dj_01_adhoc_250828.pdf
---
Remove row for "Common-mode to common-mode return loss, RLcc (min)" and remove section: 178.9.2.7 Transmitter common-mode to differential-mode return loss
Add 3 rows to Table 178-6
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
There are similar comments suggesting multiple changes in the draft.
The suggested specifications were mentioned in the ad hoc presentation <https://www.ieee802.org/3/dj/public/adhoc/electrical/25_0828/mellitz_3dj_adhoc_01a_250828.pdf> but a proposal for their definitions was not included. The suggested remedy includes some additional details, but is not sufficient to implement.

The following straw poll was taken.

Straw poll #E-1 (direction):
I would support the direction of modal ERL and modal RL as in the suggested remedy and the referenced presentation.
Y: 15 N: 4 NMI: 15 A: 8

Based on the straw poll there is interest in exploring the proposed method. However, there is no consensus to implement the proposed changes at this time.
Further contributions including a detailed proposal of the intended implementation and consensus building are encouraged.

---

*Cl* **178** *SC* **178.9.2** *P* **376** *L* **11** # 278

Kutscher, Noam Marvell

*Comment Type* **T** *Comment Status* **R** *(bucket) TX jitter (E)*

A difference of 0.002 is not a resolution that the Scope can provide.

*SuggestedRemedy*

Change the Tx package Class A value to be '0.12' instead of '0.118'.

*Response* *Response Status* **C**

REJECT.
Jitter specifications to 3 significant digits is consistent with previous clauses (e.g. 162, 163) and with the other electrical clauses in this draft.
No evidence has been presented that scopes cannot provide this resolution.

---

*Cl* **178** *SC* **178.9.2.1.1** *P* **376** *L* **39** # 272

Kutscher, Noam Marvell

*Comment Type* **T** *Comment Status* **A** *KR test fixture IL (E)*

Test fixture IL range of 3.4dB - 4.4dB cannot be met with high radix device.

*SuggestedRemedy*

Correct the value to be between 3.4dB to 8.5dB.
Reasoning for the new range: Simple Loss Calculation-
a. ~1.5' escaping, assuming 1.5dB/inch = ~1.8dB
b. 2 X Via = ~2dB
c. PCB- 3inch - ~3.6dB
d. SMA = ~0.5dB
Total estimated loss ~7.9dB - change to 8.5dB.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The values in D2.1 were established by the resolution to comment #65 against D1.2, in which is was noted that a tighter IL range is necessary to ensure consistent ERL measurement results. Refer to <https://ieee802.org/3/dj/public/24_11/ran_3dj_01a_2411.pdf#page=28>.
The suggested remedy is based on a high-radix device package which would require a higher loss for the escape from the package-to-board interface to the test point.

The CRG reviewed slide 19 in <https://ieee802.org/3/dj/public/25_09/ran_3dj_01b_2509.pdf>.
In the CRG discussion it was noted that most of the transmitter specifications take the test fixture into account (dERL, dvf) or are relatively insensitive to the IL (SNDR, jitter). There was general support for option 1 as listed in the slide.

Implement the suggested remedy, and add a recommedation that the IL be as low as feasible for the device under test within the specified range.
Implement in 178 and 176C using the same range, with editorial license.

*Cl* **178** *SC* **178.9.2.6** *P* **378** *L* **47** # 311

Levin, Itamar — Altera corp.

*Comment Type* **T** *Comment Status* **A** *(bucket) SCMR) (E)*

When changing from vpeak to Psignal in this formula going from D2.0 to D2.1, we now have a ratio of power to voltage within the log function, insetead of a "unit-less" ratio. Note that in eq 179-8 Psignal is a sum of squares of pulse shapes which is proportional to power indeed (like in its use in eq. 179-9). And yet we have 20log . If the formula originated from 10log(P/V^2) than that is still incorrect since this expression corrosponds to 20log(P^0.5/V)

*SuggestedRemedy*

If the intent here is to use Psignal, than in this formula we should take the root of this quantity in order to fix the ratio, or conversely - use 10log(Psignal/Vcm^2) in order for the quantity within the log function be unit-less.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #252.

[Editor's note: changed page/line from 415/14]

*Cl* **178** *SC* **178.9.2.6** *P* **378** *L* **47** # 252

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *(bucket) SCMR (E)*

Comment 48 in
https://www.ieee802.org/3/dj/comments/D2p0/8023dj_D2p0_comments_final_clause.pdf
Not implemented.

*SuggestedRemedy*

Either change equation 178-1
To
SCMR= 10*log10(P_signal / VCM_FB^2)
Or
SCMR= 20*log10(sqrt(P_signal) / VCM_FB)

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Change equation (178-1) to SCMR= 10*log10(P_signal / VCM_FB^2).

*Cl* **178** *SC* **178.9.2.6** *P* **378** *L* **52** # 312

Levin, Itamar — Altera corp.

*Comment Type* **E** *Comment Status* **R** *(bucket) (E)*

The accurate clause is not 179.9.4.5 but subclause 179.9.4.5.1

*SuggestedRemedy*

change 179.9.4.5 to 179.9.4.5.1

*Response* *Response Status* **C**

REJECT.
179.9.4.5.1 was the subclause in D2.0 but its content was merged into 179.9.4.5.
[Editor's note: changed page/line from 415/19]

*Cl* **178** *SC* **178.9.2.7** *P* **379** *L* **20** # 344

Simms, William — NVIDIA

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

RLcd is defined but RLdc is used for equation and plot

*SuggestedRemedy*

Change RLcd to RLdc in the definition

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "where RLcd is the differential-mode to common-mode" to "where RLdc is the common-mode to differential-mode"
Implement in 178.9.2.7 and in 176C.6.3.7, with editorial license.

*Cl* **178** *SC* **178.9.3** *P* **380** *L* **13** # 254

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *mode conversion (E)*

There appears to be little connection between the
Differential-mode to common-mode return loss, RLcd mask
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 178-9

*SuggestedRemedy*

Remove row for "Differential-mode to common-mode return loss, RLcd" and remove section: 178.9.3.7 Receiver differential-mode to common-mode return loss
Add 3 rows to Table 178-9
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **178** *SC* **178.9.3.3** *P* **380** *L* **44** # 382

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *t) RX amplitude tolerance (E)*

In D2.1 the receiver amplitude tolerance text has been expanded in clause 179, and now the text in clause 178 and Annex 176C does not match it.
The requirement is essentially the same so the text should be similar (with perhaps different references).

*SuggestedRemedy*

Change the text in 178.9.3.3 and in 176C.6.4.2 to match the text in 179.9.5.2.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.9.3.3** *P* **380** *L* **48** # 332

Mascitto, Marco — Nokia

*Comment Type* **T** *Comment Status* **R** *(bucket) ITOL (E)*

The receiver's control of the transmitter's equalizer coefficients is an important function that helps that receiver to meet the block error ratio. Recommend making this normative.

*SuggestedRemedy*

Change "The receiver may control" to "The receiver should control".

*Response* *Response Status* **C**

REJECT.
Receiver control of the transmit equalizer coefficients is an implementation choice, and some implementations may not need it to meet the test requirements. It is therefore optional to use the transmitter control in this test.
Note that the ILT function is a normative requirement regardless of this test.

*Cl* **178** *SC* **178.9.3.4.2** *P* **381** *L* # 384

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *ITOL (E)*

Unlike the ITOL specification in 179.9.5.3.3, there is no recommendation here to have a jitter close to the specified limits of J4u03 and JRMS.

*SuggestedRemedy*

In the fourth item of the dashed list (calculation of A_DDD and sigma_RJ), append the following sentence:
"If the transmitter jitter can be controlled, it is recommended to adjust jitter such that J4u03 and JRMS are as close as practical to their limits in Table 178-6".
Apply a similar change in 176C.6.4.5.2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The recommendation may be better placed in 178.9.3.4.1.
Implement the suggested remedy with editorial license.

*Cl* **178** *SC* **178.9.3.4.2** *P* **381** *L* **52** # 383

Ran, Adee — Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) ITOL (E)*

in "J4u03" the "u" should not be in subscript.

*SuggestedRemedy*

Change to normal text.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.9.3.4.3** *P* **382** *L* **37** # 280

Kutscher, Noam Marvell

*Comment Type* **T** *Comment Status* **A** *ITOL (E)*

It is not mentioned what the transmitters not under test in the DUT should transmit.

*SuggestedRemedy*

Specify what they should transmit as specified in 179.9.5.3.5.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
In 178.9.3.4.3, add an item with text based on the following sentence (from 179.9.5.3.5): "During the test, the transmitters in the device under test transmit either PRBS31Q or scrambled idle, with equalization turned off (preset 1 condition)."
Add a similar item in 176C.6.4.5.3.
Implement with editorial license.
[CC 178, 176C]

*Cl* **178** *SC* **178.9.3.4.3** *P* **382** *L* **44** # 270

Kutscher, Noam Marvell

*Comment Type* **T** *Comment Status* **A** *ITOL (E)*

The Test 1 & 2 here has no connection to Test1&2 on the COM (page 385, line 28-29 & 39-40) and should be rephrased.

*SuggestedRemedy*

Rephrase one of them to 'case 1' 'case 2' instead of 'test1' and 'test2'.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The existence of two things labeled "test 1" is confusing.

Change the labels in table 178-10 from "Test 1 (low loss)" to "Test L (low loss)", and similarly for Test 2. Make a corresponding change in references to this table.

Apply in Clause 178 and coresponding tables in clause 179, Annex 176C, and Annex 176D.

Implement with editorial license.

*Cl* **178** *SC* **178.9.3.4.3** *P* **382** *L* **49** # 274

Kutscher, Noam Marvell

*Comment Type* **T** *Comment Status* **A** *ITOL (E)*

A nominal 15 dB low-loss ITOL IL value does not reflect a real KR system.

*SuggestedRemedy*

Correct the value to be 20dB.
Reasoning for the new range: Simple Loss Calculation-
Twice of the below calculation:
a. ~1.5' escaping = ~1.8dB
b. 2 X Via = ~2dB
c. PCB- 3inch = ~3.6dB
d. SMA = ~0.5dB
+connector = ~3dB
Total estimated loss ~18.8dB - change to 20dB.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #273.

*Cl* **178** *SC* **178.9.3.5** *P* **383** *L* **10** # 304

Healey, Adam Broadcom, Inc.

*Comment Type* **TR** *Comment Status* **A** *JTOL (E)*

Figure 93-12 does not include broadband noise injection and therefore does not represent the specified jitter tolerance test setup. It is unclear why there are references to Annex 93A, 93C, and 120D.

*SuggestedRemedy*

Add a new figure to 178.9.3.5 that illustrates a test setup with both jitter and noise injection. Replace the second sentence of the first paragraph of 178.9.3.5 with a reference to this new figure.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #302.

*Cl* **178** *SC* **178.9.3.5** *P* **383** *L* **14** # 305

Healey, Adam — Broadcom, Inc.

*Comment Type* **TR** *Comment Status* **A** *JTOL (E)*

178.9.3.4.1, which is incorporated into this test procedure by reference, states that the "transmitter meets the requirements stated in 178.9.2.". It should be made clear that the transmitter still needs to meet the requirements stated in 178.9.2 when the added jitter from Table 179-13 is included.

*SuggestedRemedy*

Add a statement to 178.9.3.5 that the transmitter meets the requirements in 178.9.3.4.1 with the added jitter from Table 179-13 included.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Note that this comment is related to comments #307 and #308.
Resolve using the response to comment #308.

*Cl* **178** *SC* **178.9.3.5** *P* **383** *L* **14** # 302

Healey, Adam — Broadcom, Inc.

*Comment Type* **TR** *Comment Status* **A** *JTOL (E)*

The list of exceptions does not appear to be correct. The first major bullet "The test channel COM, calculated per the method in 178.9.3.4.2, is at least 3 dB" is not an exception. It is part of the test procedure defined in 178.9.3.4. The first sub-bullet "For the COM parameter calibration described in 93C.2 item 7)" refers to the Annex 93A-based calbiration procedure which has been replaced by the procedure defined in 178.9.3.4. It is unclear why this reference is here. In the second sub-bullet, the text about substitution of J4u03 for J4u does not apply since the procedure defined in 178.9.3.4.2 is based on J4u03. The only exception seems to be that the transmitter output is measured with the added sinusoidal jitter.

*SuggestedRemedy*

Remove the bulleted list from 178.9.3.5. Replace the last sentence of the first paragraph with the following. "The test procedure is the same as the one described in 178.9.3.4 with the exception that trasmitter output is measured with the jitter frequency and amplitude set according to Case G from Table 179-13". Note that the case used for calibration is the subject of a separate comment.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 17 in <ran_01b>.

Implement the combined suggested remedies of this comment and comments #303, 304, 305, with editorial license.

*Cl* **178** *SC* **178.9.3.5** *P* **383** *L* **16** # 155

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **T** *Comment Status* **R** *JTOL (E)*

Jitter tolerance test must be performed at max PPM offset

*SuggestedRemedy*

Add followig sentence:
JTOL generator must be at +/-50 PPM from the receiver under test.

*Response* *Response Status* **C**

REJECT.
The requirement to meet jitter tolerance (and other receiver specifications) across the specified frequency range is stated in 178.9.3.2.

*Cl* **178** *SC* **178.9.3.5** *P* **383** *L* **17** # 385

Ran, Adee — Cisco Systems

*Comment Type* **E** *Comment Status* **A** *JTOL (E)*

The dashed list format should be:
- The test channel COM <.>
- For the COM parameter calibration described in 93C.2 item 7): (same level)
[2nd level] - Additive noise is calibrated with jitter specified in case G from Table 179-13.
[2nd level] - Both JRMS and J4u03 are measured with the additive noise and the jitter of case G. [see other comment]
[2nd level] - J4u is substituted by the measured value of J4u03.

*SuggestedRemedy*

Change per comment, with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #302.

*Cl* **178** *SC* **178.9.3.5** *P* **383** *L* **20** # 386

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *JTOL (E)*

"Case F" used for jitter was intended to be the highest frequency case, should have been changed to case G when we added an extra case.
Also in 176C.6.4.6.

*SuggestedRemedy*

Change "Case F" to "Case G" in both subclauses. Change the phrasing is necessary with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #302.

*Cl* **178** *SC* **178.9.3.5** *P* **383** *L* **20** # 303

Healey, Adam — Broadcom, Inc.

*Comment Type* **TR** *Comment Status* **A** *JTOL (E)*

It is stated that jitter is measured for Case F using the additive noise obtained from calibration using Case G. This seems like a convoluted calibration procedure and the benefit of it is not clear.

*SuggestedRemedy*

Simplify the exception to be "the transmitter output is measured with the jitter frequency and amplitude set according to Case G from Table 179-13."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #302.

*Cl* **178** *SC* **178.10** *P* **384** *L* **40** # 256

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *mode conversion (E)*

There appears to be little connection between the
Differential-mode to common-mode return loss, RLcd mask
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 178-11

*SuggestedRemedy*

Remove row for "Differential-mode to common-mode return loss, RLcd" and remove section: 178.10.5 Channel mode conversion insertion loss
Add 3 rows to Table 178-9
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **178** *SC* **178.10** *P* **384** *L* **42** # 255

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *mode conversion (E)*

In Table 178-11, the rows labeled:
Differential-mode to common-mode insertion loss (ILcd) and
Common-mode to differential-mode insertion loss (ILdc)
appear to describe a impairments already captured by the SCMR_CH metric. Both are like SNR as the delta is like an SNR.
In addition, there appears to be little connection between the ILcd and ILdc masks and link performance, as small excursions beyond the mask may show negligible impact.

*SuggestedRemedy*

Remove the following rows from Table 178-11:
Differential-mode to common-mode insertion loss (ILcd)
Common-mode to differential-mode insertion loss (ILdc)
Add SCMR_DC_CH to Clause 179.11.8 "Channel signal to common-mode ratio"
Replace references to CD with DC to align with the updated SCMR terminology and COM implementation.
Add the following row to Table 178-11:
SCMR_DC_CH (min) = 20 dB
Reference Supporting Material:
See presentation: mellitz_COM_01_250819.pdf
This document outlines the COM implementation updates for SCMR_DC and SCMR_CD, including frequency-domain and time-domain computations, and supports the proposed simplification and consolidation of mode conversion metrics.

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #260.

*Cl* **178** *SC* **178.10.** *P* **384** *L* **28** # 387

Ran, Adee — Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

"the channel is bound by TP0 and TP5"
"bound" does not seem natural here.
Also in 176C.7.

*SuggestedRemedy*

Change to "The channel is defined between TP0 and TP5" or alternatively "The channel is delimited by TP0 and TP5".
Apply a similar change in 176C.7.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change to "The channel is defined between TP0 and TP5".
Also, apply to 176C.7.

*Cl* **178** *SC* **178.10.** *P* **384** *L* **36** # 388

Ran, Adee
Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

"Tp0d to Tp5d" - P should be uppercase

*SuggestedRemedy*

Change to "TP0d to TP5d"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.10.** *P* **384** *L* **45** # 389

Ran, Adee
Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(bucket) (E)*

In Table 178-11, maximum AC coupling frequency of 100 kHz does not match the value in referenced subclause, which was changed to 250 kHz.
In Table 176C-6, the value is 50 kHz, not matching the reference either.

*SuggestedRemedy*

Change to 250 kHz in Table 178-11 and in Table 176C-6.

*Response* *Response Status* **W**

ACCEPT.

*Cl* **178** *SC* **178.10.** *P* **384** *L* **47** # 390

Ran, Adee
Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

Missing reference for SCMR_CH.

*SuggestedRemedy*

Add a reference to 179.11.8 (or another place if the location of the definition changes).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #251.

*Cl* **178** *SC* **178.10.1** *P* **386** *L* **6** # 391

Ran, Adee
Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *:et) Reference Impedance (E)*

In Table 178-12, R0 should be 46.25 Ohm (Slide 12 of https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01c_2507.pdf).
Also in Table 176C-7.

*SuggestedRemedy*

Change per comment (2 places).

*Response* *Response Status* **W**

ACCEPT.

*Cl* **178** *SC* **178.10.1** *P* **387** *L* **30** # 392

Ran, Adee
Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *COM P_QC (E)*

Using 2*DER0 as the quantization clip probability does not represent realistic implementations. In practice clipping noise is typically caused by low-frequency events and thus creates correlated errors. Having correlated errors at a probability of 2*DER0 would be devastating for the RS-FEC. In addition, the clipping noise is not accounted for in the COM calculations - this is only justified if the probability of clipping events is much smaller than the COM quantile.
The clipping probability determines the peak-to-peak of the quantized signal. For other "peak to peak" specifications we use a probability of 1e-7 (see 176D.8.1).

*SuggestedRemedy*

Change the value of P_QC from 2*DER0 to 1e-7 in all COM tables (clauses 178 and 179, annexes 176C and 176D).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG has reviewed slide 14 of ran_01a<URL>.

Implement the suggeted remedy in 178, 179, 176C and 176D.

*Cl* **178** *SC* **178.10.6** *P* **390** *L* **32** # 393

Ran, Adee
Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *AC coupling (E)*

AC coupling in the channel should be between TP0 and TP5; the extensions to TP0d and TP5d do not make sense, since these are the package parts of the channel, parts of the PMD, not of the channel.
Placing AC coupling in the package is possible, but it would make the system fall under the second paragraph (engineered link).

Since the channel is defined in 178.10 as TP0 to TP5, this should not be an exception.

Also in Annex 176C.

*SuggestedRemedy*

Change "(between TP0d and TP5d)" to "(between TP0 and TP5)" or just delete the parenthetic text.

In Table 178-11, in the row for AC coupling, delete "between TP0d and TP5d".
Apply a similar change in Table 176C-6.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment suggests reverting a change that was applied by the resolution of comment #255 against D1.3 (see <https://www.ieee802.org/3/dj/comments/D1p3/8023dj_D1p3_comments_final_id.pdf#page=59>). The motivation in that comment was "Location of AC coupling may also be on chip and stating TP0 to TP5 would not allow that".
Howerver, the change that was applied does not address the original comment well, since "on chip" coupling is not within TP0d-TP5d either. On-chip AC coupling is addressed by the second paragraph, "Systems with no AC-coupling within the channel".

The expansion of the location of AC coupling to include the packages is arguably not helpful, and it might cause confusion since the package is part of the PMD.
Note that comment #215 is based on the existing text (TP0d-TP5d).

Implment the suggested remedy, and also apply the corresponding change in Table 176C-6 .

*Cl* **178** *SC* **178.10.6** *P* **390** *L* **32** # 203

Brown, Matt
Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *AC coupling (E)*

In Draft 2.1, much of the ambiguity of the "channel" has been resolved. However, the following text is self-contradicting. "the channel" is clearly defined as being from TP0 to TP5, but the intent here is to define and alternate channel TP0d to TP5d. The paranthetheses imply this is helpful but not necessary information. Instead the parentheses should be removed.

*SuggestedRemedy*

Change "the channel (between TP0d and TP5d)" to "the channel between TP0d and TP5d"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolved using the response to comment #393.

*Cl* **178** *SC* **178.10.6** *P* **390** *L* **35** # 204

Brown, Matt
Alphawave Semi

*Comment Type* **T** *Comment Status* **R** *(withdrawn)*

The following paragraph is informative since it gives information that is not normative or building upon normative content.
"Systems with no AC-coupling within the channel are considered engineered links. It is the system integrator's responsibility to verify that the transmitter and the receiver are compatible with the common-mode voltage differences that may exist in this configuration."

*SuggestedRemedy*

Change the paragraph to an informative note, starting with "NOTE--"

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **178A** *SC* **178A.1.9.3** *P* **830** *L* **37** # 1

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **R** *(bucket) (E)*

Based on this paragraph, calculation of the noise PDF starts with a Dirac delta function and moves on to include the non-Gaussian crosstalk and dual-Dirac jitter noises in the following two paragraphs. Then, the third following paragraph adds the remaining Gaussian noise terms. However, this process of calculating noise PDF misses the ISI noise.

*SuggestedRemedy*

Add a description to include the ISI noise PDF and its calculation using reference to the procedure defined in 93A.1.7.3. This can be done by either adding another convolution step or starting with ISI noise PDF instead of a Dirac delta function.

*Response* *Response Status* **W**

REJECT.
The draft is correct as written.
The preceding paragraph states that "DELTA is defined in 178A.1.7.6 with the exception that the Gaussian approximation of the probability density function of the noise amplitude pga(y) is replaced with the probability density function of the noise amplitude pn(y) defined below." The definition of DELTA in 178A.1.7.6 is based on the convolution of the probability distribution function of the noiseless signal amplitude prior to quantization ps(n) and the Gaussian approximation of the probability density function of the noise amplitude prior to quantization pga(y). Substitution of pn(y) for pga(y) means that pn(y) will be convolved with ps(y) to generate the probability distribution function for signal and noise amplitude prior to quantiation psn(y) that is used to determine the quantization step DELTA. Since ps(y) is defined in 178A.1.7.6 to include the signal and inter-symbol interference, all of the appropriate terms are being included.

*Cl* **178B** *SC* **178B.1** *P* **835** *L* **12** # 196

Bruckman, Leon — Nvidia

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

This is an annex not a clause

*SuggestedRemedy*

Change: "This clause defines" to: "This annex defines"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.1** *P* **835** *L* **12** # 217

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

Opening states - "This clause."
this is an annex

*SuggestedRemedy*

Replace "clause" with "annex"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.2** *P* **835** *L* **22** # 414

Ran, Adee — Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

"Through this communication, ILT creates a well-defined path start-up process for paths that include one or more ISLs"
The path start-up protocol in 178B.6 should be referenced.

*SuggestedRemedy*

Add "(see 176B.6)" in this sentence and reword if necessary with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.2** *P* **835** *L* **23** # 320

Mascitto, Marco — Nokia

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

In TRAINING mode, locally generated training frames are sent to the peer interface, not data.

*SuggestedRemedy*

Replace:
Initially all ISLs are in TRAINING mode, in which the data sent to the peer is generated locally by each interface.

With:
Initially all ISLs are in TRAINING mode, in which the training frames sent to the peer are generated locally by each interface.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "Initially all ISLs are in TRAINING mode, in which the data sent to the peer is generated locally by each interface."
To: "Initially all AUI components and PMDs that have ILT enabled are in TRAINING mode (tx_mode = training, see 178B.7.3.1), in which the training frames sent to the peer are generated locally by each interface."
In the following paragraph change: "ILT includes a training protocol, used in TRAINING mode,"
To: "ILT defines a training protocol, used in TRAINING mode (tx_mode = training, see 178B.7.3.1),"
Implement with editorial license.

*Cl* **178B** *SC* **178B.2** *P* **835** *L* **23** # 464

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

When you use local pattern you don't enter "TRAINING mode".

*SuggestedRemedy*

Change "TRAINING mode," to "a tx mode (see 178B.5)"

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #320.

*Cl* **178B** *SC* **178B.2** *P* **835** *L* **23** # 415

Ran, Adee — Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

"Initially all ISLs are in TRAINING mode"
It is the AUIs or AUI components that are in TRAINING mode.

*SuggestedRemedy*

Reword as necessary with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #320.

*Cl* **178B** *SC* **178B.2** *P* **835** *L* **25** # 479

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

The coordinated transition is the start-up protocol portion of ILT, give a reference from here to it.

*SuggestedRemedy*

Add "(see 178B.6)" after DATA mode

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Change: "The ILT function provides coordinated transition of all ISLs to DATA mode,"
To: "The ILT function provides coordinated transition of all ISLs to DATA mode (tx_mode = data, see 178B.7.3.1),"
Implement with editorial license.

*Cl* **178B** *SC* **178B.2** *P* **835** *L* **27** # 465

Slavick, Jeff — Broadcom

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

ILT defines the training protocol not really includes.

*SuggestedRemedy*

Change "includes" to "defines"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #320.

*Cl* **178B** *SC* **178B.2** *P* **835** *L* **30** # 321

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The last sentence of this paragraph is not clear and may lead to confusion.

*SuggestedRemedy*

Replace:
ILT can also establish communication between interfaces that do not use a training protocol.

With:
ILT ensures that any ISLs in the path that do not make use of the training protocol (e.g., ISLs using 100Gb/s lane technology) signal their readiness for DATA mode so that the end-to-end path start-up process can complete successfully.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "ILT can also establish communication between interfaces that do not use a training protocol."
To: "ILT allows ISLs in the path that do not make use of the training protocol to signal their readiness for DATA mode (tx_mode = data, see 178B.7.3.1) so that the end-to-end path start-up process can complete successfully."
Implement with editorial license.

*Cl* **178B** *SC* **178B.3** *P* **836** *L* **14** # 10

Brown, Matt Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The span labelled "Physical Layer implementation" is intended to convey simply that this portion of the diagram is representative of the entire Physical Layer not an implementation; otherwise PHY and xMII Extender should be labelled as implementations as well.

*SuggestedRemedy*

Change "Physical Layer implementation" to "Physical Layer".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.3** *P* **836** *L* **15** # 324

Mascitto, Marco Nokia

*Comment Type* **T** *Comment Status* **A** *Path (CI)*

Update the figure showing the path between RSs, per straw ballot results.

*SuggestedRemedy*

Update the figure showin the path between RSs, per straw ballot results.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #417.

*Cl* **178B** *SC* **178B.3** *P* **836** *L* **30** # 471

Slavick, Jeff Broadcom

*Comment Type* **TR** *Comment Status* **A** *Path (CI)*

Add "path" to the drawing, which per 1.4 is defined as "The sequence of segments and repeaters providing the connectivity between two DTEs in a
single collision domain. In CSMA/CD networks there is one and only one path between any two DTEs."

*SuggestedRemedy*

Insert a "| <---------> |" at the bottom of Figure 178B-1 which begins at the left edge of the DTE XS and ends at the right edge of the rightmost PCS box. With the word "path" below the line.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #417.

*Cl* **178B** *SC* **178B.3** *P* **856** *L* **12** # 51

Brown, Matt Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

Add cross-reference to state diagram figure.

*SuggestedRemedy*

After "state diagram" insert "(see Figure 178B-12)"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.4** *P* **836** *L* **40** # 247

He, Xiang — Huawei

*Comment Type* **ER** *Comment Status* **R** *(bucket) (CI)*

The sentence "A physically instantiated interface is
either a PMD or an AUI component." is repeated too many times in this Annex.

*SuggestedRemedy*

Consider to define this once in front (in fact it has been defined in 178B.3 which is the perfect place), and remove all other repeatitions in the following text.

*Response* *Response Status* **W**

REJECT.
This wording is used only in this pararaph and it adds clarity to the text.

*Cl* **178B** *SC* **178B.4** *P* **836** *L* **42** # 11

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **R** *Interfaces (CI)*

Nomenclature is inconsistent. This is the only part of this Annex that uses "AUI-C2C" and "AUI-C2M". 178B.3 defines xAUI-n; this should be used instead. The references to Annex 176C and Annex 176D are limiting assuming future AUI also use Annex 178B; so these should be examples of references.

*SuggestedRemedy*

Change (twice in this paragraph) "AUI-C2M (Annex 176D)" to "xAUI-n C2M (e.g., see Annex 176D)"
Change (twice in this paragraph) "AUI-C2C (Annex 176C)" to "xAUI-n C2C (e.g., see Annex 176C )".

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **178B** *SC* **178B.4** *P* **836** *L* **47** # 325

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

Improve clarity.

*SuggestedRemedy*

Replace:
The ILT function in AUI components and PMDs is composed of one per-interface function and one per-lane function for each lane associated with the interface as shown in Figure 178B-2.

With:
The ILT function at an interface is composed as shown in Figure 178B-2, with:
- one per-interface function
- one per-lane function for each lane associated with the interface

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #12.

*Cl* **178B** *SC* **178B.4** *P* **836** *L* **48** # 12

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

It sounds like you have both a per-interface function and one per-lane function on each lane. Clarify text.

*SuggestedRemedy*

Change "is composed of one per-interface function and one per-lane
function for each lane associated with the interface"
Change "is composed of one per-interface function for the entire interface and one per-lane function for each lane associated with the interface"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.4** *P* **837** *L* **19** # 13

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

In Figure 178B-2, it would be helpful to point out that the DLi and SLi are attaching to the medium or AUI channel.

*SuggestedRemedy*

Add a label to the right "Medium or AUI Channel"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.5** *P* **837** *L* **41** # 452

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *ILT (CI)*

The bullets desribing the path start-up process is too wordy and confusing.

*SuggestedRemedy*

Update 178B.5.1 to read as follows:
ILT on each interface operates with the following behavior:
- Each lane of ISL begin in TRAINING mode or by sending a local data pattern (when TRAINING is not supported or disabled).
- Each lane of the ISL independently achieve local_rx_ready indicating that lane has completed its adaptation processes and is ready to move to DATA mode.
- Each ISL achieves local_rts indicating all lanes of the AUI/PMD are ready to move to DATA mode.
- Each ISL achieves remote_rts indicating adjacent AUI/PMDs are ready to move to DATA mode.
- When local_rts and remote_rts are both true it means all ISLs in the Path are ready to move to DATA mode.
- When all ISLs have switched to DATA mode then communication on the Path is established.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

It would be good to make this description more concise.

Update the description based on the suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.5** *P* **837** *L* **47** # 327

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **R** *(bucket) (CI)*

The "rts" in variables local_rts and remote_rts is misleading and caused confusion. When asserted, it means the interface is ready to send (RTS) and receive (CTS) data, not just send data.

*SuggestedRemedy*

Propose changing local_rts to local_ifready and remote_rts to remote_ifready.

*Response* *Response Status* **C**

REJECT.
The term RTS is well defined. Implementing the proposed change may create confusion with the rx_ready indication.

*Cl* **178B** *SC* **178B.5** *P* **837** *L* **47** # 14

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

local_rts, remote_rts, and remote_rx_ready are defined as Boolean variable thus should be given values true and false, not 0 and 1.

*SuggestedRemedy*

Change "1" to "true" on ...
page 837 line 47
page 838 lines 7, 13, 16, 18
Change "0" to "false" on .
page 838 line 16
Apply similarly elsewhere as necessary.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.5** *P* **849** *L* **28** # 24

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

Paragraph begins with an incomplete sentence/thought. The same is conveyed more clearly in the first sentence of 178B.5.7 "Equalization control is only available for the E1 format."

*SuggestedRemedy*

Change "Only applies for E1 format" to "The initial condition request only applies for the E1 format."
Make similar updates in 178B.5.3.4, 178B.5.3.5, 178B.5.4.5, 178B.5.4.7, 178B.5.4.8.
Align text in 178B.5.7.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **178B** *SC* **178B.5.1.1** *P* **838** *L* **26** # 16

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

Training frames are always based on a local clock regardless of the other interface state.

*SuggestedRemedy*

Delete "In this case".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178B** *SC* **178B.5.1.1** *P* **838** *L* **28** # 17

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

It would be good to be clear about where the recovered clock is coming from.

*SuggestedRemedy*

Change "recovered clock" to "recovered clock from the receiver on the other interface" or similar.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **178B** *SC* **178B.5.1.1** *P* **838** *L* **32** # 469

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

The transmit clock functional mode may not be based upon the PCS clock. It may based on DTE XS or PHY XS or not ever change.

*SuggestedRemedy*

Change:
As shown in the RTS control state diagram (Figure 178B-9) local_rts is set to true only after the transmit clock is derived from the PCS clock, such that the transition between clock sources occurs while sending local_rts = false.
To:
As shown in the RTS control state diagram (Figure 178B-9) local_rts is set to true only after the transmit clock is derived from its mission mode source (local_rts is false when a transition between clock sources occurs).

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Change: "local_rts is set to true only after the transmit clock is derived from the PCS clock"
To: "local_rts is set to true only after the transmit clock is derived from the clock recovered by the other interface receiver"

---

*Cl* **178B** *SC* **178B.5.1.1** *P* **838** *L* **32** # 18

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

Misused comma.

*SuggestedRemedy*

Delete comma between "PCS clock and such".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178B** *SC* **178B.5.1.2** *P* **839** *L* **38** # 470

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

Which same process? The Retimer process?

*SuggestedRemedy*

Remove 178B.5.1.2 there is no need to call out anything special here.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Remove the colon after "process" to make clear to whcih process the text refers.

*Cl* **178B** *SC* **178B.5.1.2** *P* **839** *L* **38** # 417

Ran, Adee
Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *Path (CI)*

Based on straw poll results and discussion in the Annex 178B ad hoc, there is consensus that the path start-up protocol should span the path that includes the two Physical Layer implementations (MAC to MAC), including extenders. For this purpose, the exchange of information (e.g., RTS) between PHY XS and the PCS across the xMII should be defined.

*SuggestedRemedy*

A presentation with a detailed proposal will be provided.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_09/ran_3dj_03_2509.pdf

Implement the proposal on slides 11 to 13 in ran_3dj_03_2509 with editorial license.

*Cl* **178B** *SC* **178B.5.2.2** *P* **841** *L* **1** # 20

Brown, Matt
Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

The sentence "Each interface using ILT shall identify
which format is relevant for it." does not make sense. How is an interface to identify a preferred format. Perhaps that clause or annex that specifies the interface should identify the format, given that is the case.

*SuggestedRemedy*

Change sentence to "The training frame format is specified by the clause specifying the AUI component or PMD."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.5.2.2** *P* **841** *L* **1** # 472

Slavick, Jeff
Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

Only interfaces that use training mode need to specify which training format they use.

*SuggestedRemedy*

Change:
Each interface using ILT shall identify which format is relevant for it.
To:
Each interface using ILT that supports TRAINING mode shall specify which format it uses.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #20.

*Cl* **178B** *SC* **178B.5.2.3** *P* **841** *L* **14** # 473

Slavick, Jeff
Broadcom

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

The "(see Figure 178B-5)" is not needed at the end of the 3rd paragraph

*SuggestedRemedy*

Remove "(see Figure 178B-5)" from the end of the 3rd paragraph

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.5.2.3** *P* **841** *L* **17** # 21

Brown, Matt
Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

The setting to one value or another is mandatory, not just permitted.

*SuggestedRemedy*

Change "precoding may be enabled or disabled" to "precoding is either enabled or disabled".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.5.2.3** *P* **841** *L* **28** # 22

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **R** *(bucket) (CI)*

In Figure 178B-5, what does the box "x3" do?

*SuggestedRemedy*

Provide description of the "x3" block.

*Response* *Response Status* **C**

REJECT.
This function is described in 178B.5.2.4 second paragraph.

*Cl* **178B** *SC* **178B.5.3** *P* **845** *L* **26** # 23

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The Figure title should like be a level 4 Annex sublclause heading, 178B.5.3.1.

*SuggestedRemedy*

Change heading paragraph appropriately.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.5.3** *P* **845** *L* **26** # 236

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **ER** *Comment Status* **A** *(bucket) (CI)*

the caption of the figure,"Figure 178B-7-Initial condition request", is misplaced or the figure is missing.

*SuggestedRemedy*

Delete the caption, or add the figure.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #23.

*Cl* **178B** *SC* **178B.5.3** *P* **845** *L* **28** # 474

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

Lost the heading for "Initidal condition request".

*SuggestedRemedy*

Restore the heading for "Initial condition request". It's been converted to a Figure title.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #23.

*Cl* **178B** *SC* **178B.5.3.5** *P* **846** *L* **4** # 25

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

This paragraph defines how a coefficient not just give permission to do so.

*SuggestedRemedy*

Change "may be changed" to "is changed".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.5.4** *P* **846** *L* **53** # 26

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

In Table 178B-4 footnote a three values are described as being undefined. Why are they not just listed along with the others and mark as either "undefined" or "reserved" as is done for other fields.

*SuggestedRemedy*

For coefficient select echo add values "010, 011, and 100 and indicate they are "= reserved" or "= undefined".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
For coefficient select echo add values "010, 011, and 100 and indicate they are "= undefined". Remove footnote "a".

*Cl* **178B** *SC* **178B.5.4.2** *P* **847** *L* **38** # 30

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

The sentence is rather ambiguous; not clear if the variable reflect the state of the status bits or vice versa. Since local_tp_mode is set by the state machine it seems the status bits are set based on local_tp_mode.

*SuggestedRemedy*

Change "The training pattern status bits encode the value of local_tp_mode." to "The training status bits are encoded to convey the value of local_tp_mode."
Update 178B.5.4.3 similarly.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **178B** *SC* **178B.5.4.2** *P* **847** *L* **39** # 27

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The variable local_tp_mode is used in state diagram in Figure 178B-10 so should be defined in 178B.7.3.1

*SuggestedRemedy*

Move definition to 178B.7.3.1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #475.

---

*Cl* **178B** *SC* **178B.5.4.2** *P* **847** *L* **40** # 475

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

local_tp_mode was moved from the State variables definition even though it's used in Figure 178B-8. But others that are also encoded in the status frame did not have their variable definitions move the status frame bit descriptions (like cf_sts or coef_sel).

*SuggestedRemedy*

Move the definitions of local_tp_mode and local_mc_mode back to 178B.7.3.1 and add "(see 178B.7.3.1)" to the end of the sentence in 178B.5.4.2 and 178B.5.4.3

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **178B** *SC* **178B.5.4.2** *P* **847** *L* **42** # 31

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

It is required not just permitted to set the variable to one of the listed values.

*SuggestedRemedy*

Change "may be assigned" to "is assigned".
Update 178B.5.4.3 similarly.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **178B** *SC* **178B.5.4.2** *P* **847** *L* **43** # 29

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

This variable is set by state diagram which take precedence. It would be helpful to state explicit that the action is handled by the state diagram as is done for training_failure.

*SuggestedRemedy*

For the definitions for local_tp_mode, local_mc_mode, tx_disable, tx_mode, lane_training_status, training, and training_failure add the following sentence "The value of <variable name>
is set by the state diagram in Figure 178B-10."
For the definitions for tf_offset, local_tf_lock, new_marker, and slip_done add the following sentence "The value of <variable name>
is set by the state diagram in Figure 178B-11."
For the definitions for coef_sts, ic_req, ic_sts, and k add the following sentence "The value of <variable name> is set by the state diagram in Figure 178B-12."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy for: local_tp_mode, local_mc_mode, lane_training_status and training.
The definitions of tx_disable, tx_mode and training_failure already include the proposed reference to the state diagram.
Implement suggested remedy for: tf_offset, local_tf_lock and new_marker.
The definition of slip_done already includes the proposed reference to the state diagram.
Implement suggested remedy for: ic_req, ic_sts, and k
The definition of coef_sts already includes the proposed reference to the state diagram.
Implement with editorial license.

*Cl* **178B** *SC* **178B.5.4.3** *P* **847** *L* **39** # 28

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The variable local_mc_mode is used in state diagram in Figure 178B-10 so should be defined in 178B.7.3.1

*SuggestedRemedy*

Move definition to 178B.7.3.1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #475.

*Cl* **178B** *SC* **178B.5.4.4** *P* **848** *L* **4** # 33

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The first sentence describes the bit as a status bit to be read while the second sentence describes it as a status bit to be a set to one value or another. The second sentence is correct.

*SuggestedRemedy*

Change "When the receiver frame lock bit is set to 1, the receiver is indicating that it has identified"
To "The receiver frame lock bit is set to 1 when the receiver has identified"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #32.

*Cl* **178B** *SC* **178B.5.4.4** *P* **848** *L* **4** # 32

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

Typically, lock is defined by identifying the mark position not the infinite set of equally spaced positions. Is there some special meaning to this?

*SuggestedRemedy*

Change "positions" to "position".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "When the receiver frame lock bit is set to 1, the receiver is indicating that it has identified training frame marker positions"
To: "The receiver frame lock bit is set to 1 when the receiver has identified the training frame marker position"
Implement with editorial license.

*Cl* **178B** *SC* **178B.5.4.7** *P* **848** *L* **25** # 476

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

Add a reference to coef_sel in the coef_select_echo description.

*SuggestedRemedy*

Add this sentence to end of 178B.5.4.7 "The coefficient select echo bits reflect the value of the k variable generated by the coefficient update state diagram (Figure 178B-12)."

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.5.5** *P* **848** *L* **37** # 34

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

Training frame lock is not achiebed by "looking" but rather by "detecting".

*SuggestedRemedy*

Change "by looking for the frame marker or the inverted frame marker in" to "by detecting either the frame marker or the inverted frame marker in".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.5.7.1** *P* **849** *L* **28** # 477

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **R** *(bucket) (CI)*

There are two possible coef status values for a ic_req.

*SuggestedRemedy*

Add the following to the end of step b)
or "coefficient not supported"

*Response* *Response Status* **W**

REJECT.
Coefficient is not being selected at this stage, so it can not be unsupported.

*Cl* **178B** *SC* **178B.5.7.4** *P* **851** *L* **19** # 35

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The defining for variable ck_stp could be improved. The decription implies that the variable is something that can be set or queried. But rather the variable is representative of the step size used by the implementation but is nevertheless within the specified bounds.

*SuggestedRemedy*

Change the definition to "Variable that represents the magnitude of the change in c(k) for one step up or one step down from its current value. The value is implementation dependent but within the range specified by the clause or annex that defines the PMD or AUI component.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.5.7.4** *P* **851** *L* **22** # 36

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The set of indices are not defined by the AUI component or PMD but rather by the clause or annex that specifies them.

*SuggestedRemedy*

Change "defined by" to "specified for".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.5.9** *P* **851** *L* **44** # 37

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

Although the changes are permitted to occur during this time span they are to not occur outside of this time span.

*SuggestedRemedy*

Change "training pattern may occur at" to "training pattern occurs at" or "training pattern shall occur at".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "training pattern may occur at any"
To: "training pattern occurs at any"
Implement with editorial license.

*Cl* **178B** *SC* **178B.6** *P* **852** *L* **27** # 38

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

The word "can" is deprecated in the sense of giving permission. It is not clear if this is giving permission or stating the possibility of occurrence.

*SuggestedRemedy*

Assuming the intent is to give permission, change the sentence to "The path may include ISLs that do not use a training protocol."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "The path can include ISLs that do not use a training protocol."
To: "The path may include ISLs that do not use a training protocol."
Also change: "that can include AUI components and PMDs"" in the previous sentence to: "that may include AUI components and PMDs"
Implement with editorial license.

*Cl* **178B** *SC* **178B.6** *P* **852** *L* **34** # 328

Mascitto, Marco — Nokia

*Comment Type* **T** *Comment Status* **R** *(bucket) (CI)*

This statement conflicts with the variable definition in 178B.7.2.1. local_rts asserted means that the training of the local interface has completed successfully. The training of the remote interface is still undetermined, so we are not yet in the ISL_READY state.

*SuggestedRemedy*

Delete:
(it reached the ISL_Ready state in Figure 178B-10)

*Response* *Response Status* **C**

REJECT.
local_rts is set only if isl_ready is set, and that indicates that both sides have completed training.

*Cl* **178B** *SC* **178B.6** *P* **852** *L* **37** # 39

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

What is meant by "a remote AUI component or PMD"? Is this the peer interface as defined for this annex?

*SuggestedRemedy*

Change "a remote AUI component or PMD" to "the peer interface".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.6** *P* **852** *L* **41** # 248

He, Xiang — Huawei

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The sentence does not read right with the first "both" because it says "an AUI component *or* PMD" before it.

*SuggestedRemedy*

Remove the first "both" in the sentence.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.6** *P* **852** *L* **51** # 40

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

Behaviors defined in the second bullet are loosely defined as being included in the ILT umbrella, not outside. Each of the descriptions should have a qualifier as to when they apply, not delegate that to an informational note; language from 178B.5.1 can be leveraged. These bullets are not methods but rather they are means. Finally, the second bullet is insufficiently defined; should it not also include the sending of local pattern?

*SuggestedRemedy*

Change the opening sentence and two dashed bullets to the following:
Ready to send (RTS) propagates over ISLs using one of the following means:
-- If training is enabled, the continue training bit in the control field of the training frames (see 178B.5.3.1)
-- If training is disabled or not supported, the transmit disable function to send and signal detect function to detect

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Implement the suggested change with editorial license.

*Cl* **178B** *SC* **178B.7.2.1** *P* **853** *L* **40** # 118

Wienckowski, Natalie — IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucketp) (L)*

This Boolean variable is never set to true or false. It just says it is set by the RTS state diagram

*SuggestedRemedy*

Add a description of when it is set to true and when it is set to false. There isn't enough information in the spec to provide a suggestion.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the second sentence of the defintion of the local_rts variable
From:
"It is set by the RTS state diagram (see Figure 178B-9)."
To:
"Its value is set by the RTS state diagram (see Figure 178B-9)."

Implement with editorial license.

*Cl* **178B** *SC* **178B.7.2.1** *P* **853** *L* **53** # 42

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

Use of word may with means "is permitted to". Desribing a possible occurrence here not giving permission to "not work".

*SuggestedRemedy*

Change "may" to "might".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.7.2.1** *P* **854** *L* **10** # 119

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *State diagrams (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Update the definition of reset to keep it consistent with comments #74 - reset is a special case.
Modify the definition of the reset variable by adding: ", and is false otherwise." to end of the last sentence.

Implement with editorial license.

*Cl* **178B** *SC* **178B.7.2.1** *P* **854** *L* **12** # 44

Brown, Matt Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

The variable is required, not just permitted, to be set to one these values.

*SuggestedRemedy*

Change "This variable may be assigned one of the following values:"
To "This variable may is assigned one of the following values:"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "This variable may be assigned one of the following values"
To: "This variable is assigned one of the following values"

*Cl* **178B** *SC* **178B.7.2.1** *P* **854** *L* **15** # 45

Brown, Matt Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *State diagrams (L)*

It is rather inconsistent and risky to define training_status partly based on state diagram and partly based on variables. It is possible to do solely based on other variable states.

*SuggestedRemedy*

Change the definition of training_status to the following:
Enumerated variable that indicates the status of the ILT function. This variable may be assigned one of the following values:
IN_PROGRESS: if all the lane_training_status variables have the value IN_PROGRESS and local_rts has the value false.
OK: if lane_training_status for all lanes has the value OK and local_RTS has the value false
READY: if the local_rts has the value true
FAIL: if any of the lane_training_status variables has the value FAIL

In Figure 178-9 delete "training_status <-- READY" in the FORWARD_RTS state.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The training_status variable is set to one of four enumerated values. The assignment to 3 of these values is described in the variable definition, and the assignment to a single value (READY) is currently made in the RTS update state diagram. As the comment states, this is hard to parse and understand when the assignments are split this way. The assignment of the READY value should be removed from the state diagram and instead be described in the variable definition along with the other enumerated values.

Remove the assignment of training_status (training_status <= READY) from the FORWARD_RTS state of the RTS update state diagram (Fig. 178-9).

Add the definition of the READY enumerate value to the definition of the training_status variable.

Implement with editorial license and in consideration of the resolution of comment #463.

*Cl* **178B** *SC* **178B.7.2.1** *P* **854** *L* **16** # 481

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *State diagrams (L)*

Figure 178B-10 should encode all values of training_status or none of them.

*SuggestedRemedy*

Remove the training_status <= READY from Figure 178B-10
Change the definition of training_status to be:
Enumerated variable that indicates the status of the ILT function. This variable may be assigned one of the following values: IN_PROGRESS, READY, OK, FAIL. The value is based on local_status and the state of each lanes lane_training_status variable (see 178B.7.3.1):
IN_PROGRESS: if all the lane_training_status variables have the value IN_PROGRESS and local_rts has the value false.
READY: if all the lane_training_status variables are not FAIL and local_rts has the value true.
OK: if all the lane_training_status variables have the value OK.
FAIL: if any of the lane_training_status variables has the value FAIL

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #45.

*Cl* **178B** *SC* **178B.7.2.1** *P* **854** *L* **23** # 482

Slavick, Jeff — Broadcom

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

We've often used "DATA mode" to indicate state rather than tx_mode = data, which is only used as an assignement in the state machine.

*SuggestedRemedy*

Change "tx_mode = data" to "DATA mode" in the definition of uses_recovered_clock

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "to drive its output when tx_mode = data."
To: "to drive its output in DATA mode (tx_mode = data, see 178B.7.3.1)."
Implement with editorial license.

*Cl* **178B** *SC* **178B.7.2.1** *P* **854** *L* **23** # 46

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

It would be helpful to direct the reader to some background on the use of recovered clock.

*SuggestedRemedy*

Change "a clock recovered by another interface"
To "a clock recovered by another interface (see 178B.5.1.1)"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested change with editorial license.

*Cl* **178B** *SC* **178B.7.2.4** *P* **855** *L* **18** # 47

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

The inclusion of adjacent_remote_rts in the transition is redundant or uncecessary since if it is false then the state would transition to the "START" state.

*SuggestedRemedy*

In the transition from "WAIT_ADJACENT" to "SWITCH_CLOCK" delete "* adjacent_remote_rts"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.7.3** *P* **855** *L* **50** # 483

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

When we enter PATH_READY the state of local_mc_mode should apply to the given interface that it's set on, not any other interface. As we sometimes use adjacent to mean "the other PMA" versus the PMA that is providing the data for this interface.

*SuggestedRemedy*

Remove the word adjacent from the 2nd and 3rd paragraphs in four places.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #60.

*Cl* **178B** *SC* **178B.7.3** *P* **855** *L* **50** # 486

Slavick, Jeff — Broadcom

*Comment Type* **T** *Comment Status* **R** *State diagrams (L)*

The 2nd paragraph of 178B.7.3 is really talking about the behavior of the Modulation and precodig status that's described in 178B.5.4.3. This should be part of that section.

*SuggestedRemedy*

Move the 2nd paragraph from 178B.7.3 to 178B.5.4.3

*Response* *Response Status* **C**

REJECT.
The text is related with the states described in the state diagram. They are relevant for the implementor of the state diagram, so they are useful in this section.
[Editor's note: changed page from 956]

*Cl* **178B** *SC* **178B.7.3** *P* **855** *L* **51** # 60

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

For PMD types defined in Clause 182 and Clause 183, the adjacent sublayer that provides or reverses precoding is the Inner FEC defined in Clause 177 rather than a PMA as defined in Clause 176.

*SuggestedRemedy*

Change "the AUI component or PMD shall cause the adjacent PMA to transmit all subsequent data on the corresponding lane with precoding (see 176.7.1.2) and otherwise cause the adjacent PMA to transmit all subsequent data on the corresponding lane without precoding."
To: "the AUI component or PMD shall cause the adjacent PMA or Inner FEC to transmit all subsequent data on the corresponding lane with precoding (see 176.7.1.2) and otherwise cause the adjacent PMA or Inner FEC to transmit all subsequent data on the corresponding lane without precoding."
Change: "the AUI component or PMD shall inform the adjacent PMA that all subsequently received data on the corresponding lane includes precoding (see 176.7.1.2) and otherwise inform the adjacent PMA that all subsequently received data on the corresponding lane does not include precoding."
To: "the AUI component or PMD shall inform the adjacent PMA or Inner FEC that all subsequently received data on the corresponding lane includes precoding (see 176.7.1.2) and otherwise inform the adjacent PMA or Inner FEC that all subsequently received data on the corresponding lane does not include precoding."

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Change: "the AUI component or PMD shall cause the adjacent PMA to transmit all subsequent data on the corresponding lane with precoding (see 176.7.1.2) and otherwise cause the adjacent PMA to transmit all subsequent data on the corresponding lane without precoding."
To: "the AUI component or PMD shall cause the PMA or Inner FEC to transmit all subsequent data on the corresponding lane with precoding (see 176.7.1.2) and otherwise cause the PMA or Inner FEC to transmit all subsequent data on the corresponding lane without precoding."
Change: "the AUI component or PMD shall inform the adjacent PMA that all subsequently received data on the corresponding lane includes precoding (see 176.7.1.2) and otherwise inform the adjacent PMA that all subsequently received data on the corresponding lane does not include precoding."
To: "the AUI component or PMD shall inform the PMA or Inner FEC that all subsequently received data on the corresponding lane includes precoding (see 176.7.1.2) and otherwise inform the PMA or Inner FEC that all subsequently received data on the corresponding lane does not include precoding."

*Cl* **178B** *SC* **178B.7.3** *P* **856** *L* **1** # 485

Slavick, Jeff — Broadcom

*Comment Type* **T** *Comment Status* **A** *State diagrams (L)*

The 3rd paragraph of 178B.7.3 is really talking about the behavior of the Modulation and precodig request that's described in 178B.5.3.2. This should be part of that section.

*SuggestedRemedy*

Move the 3rd paragraph and definition of remote_mc_mode from 178B.7.3 to 178B.5.3.2

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #50.

*Cl* **178B** *SC* **178B.7.3** *P* **856** *L* **5** # 50

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The definition of remote_mc_mode is not introduced. It is also only used here and could be replaced with a reference to the received status.

*SuggestedRemedy*

Add the following to the end of the paragraph: "The variable remote_mc_mode is defined as follows:"
Also, consider deleting this variable and instead of pointing to the state of the received status "Modulation and precoding status" field.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "is entered with remote_mc_mode set to "PAM4 with precoding""
To: "is entered with the modulation and coding status of the status field of the received training frames set to "PAM4 with precoding""
Delete the remote_mc_mode variable and its definition. Remove the remote_mc_mode row from Table 178B-7.
Implement with editorial license.

*Cl* **178B** *SC* **178B.7.3** *P* **856** *L* **8** # 48

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

Use of word may with means "is permitted to". In this case, assignment to one of these is mandatory.

*SuggestedRemedy*

Change "may be" to "is".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested change with editorial license.

*Cl* **178B** *SC* **178B.7.3** *P* **856** *L* **11** # 484

Slavick, Jeff — Broadcom

*Comment Type* **E** *Comment Status* **R** *(bucket) (CI)*

The last paragraph of 178B.7.3 is describing which state machines are used which is related to the first paragraph of this section. The paragaphs between the first and last describe some specific cases related to precoding operations. So it'd be better if the first and last were next to each other.

*SuggestedRemedy*

Move the last paragraph that begins with "Interfaces using the E1 format" to be the second paragraph of this sub-clause.

*Response* *Response Status* **C**

REJECT.
This paragraph moved to this location according to the resolution of comment #499 against D2.0

*Cl* **178B** *SC* **178B.7.3** *P* **856** *L* **19** # 49

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

Use of word may with means "is permitted to". In this case, assignment to one of these is mandatory.

*SuggestedRemedy*

Change "may be" to "is assigned".
Update the definitions for coef_sts, ic_req, ic_sel, ic_sts, lane_training_status, remote_tp_mode, similarly.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license..

*Cl* **178B** *SC* **178B.7.3.1** *P* **857** *L* **10** # 120

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucketp) (L)*

This Boolean variable is never set to false.
The description includes "Otherwise it is set to true.", but never says when it it set to false.

*SuggestedRemedy*

Add a description of when it is set to false. There isn't enough information in the spec to provide a suggestion.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the definition of variable local_tf_lock
From:
"Boolean variable that is true when mr_training_enable is true and the training frame marker positions have been identified on a lane of the interface and is false otherwise. The value of this variable is encoded in the receiver frame lock bit in the status field of transmitted training frames."
To:
"Boolean variable that is set to true when mr_training_enable is true and the training frame marker positions have been identified on a lane of the interface and is set to false otherwise. The value of this variable is encoded in the receiver frame lock bit in the status field of transmitted training frames."

Implement with editorial license.

*Cl* **178B** *SC* **178B.7.3.1** *P* **857** *L* **35** # 121

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucketp) (L)*

This Boolean variable is never set to true or false. It just says it is derived from the "receiver frame lock" bit of the status field of received training frame

*SuggestedRemedy*

Add a description of when it is set to true and when it is set to false. There isn't enough information in the spec to provide a suggestion.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of variable remote_tf_lock
From:
"Boolean variable that indicates the value of local_tf_lock on a lane of the peer interface. If mr_training_enable is true, it is derived from the "receiver frame lock" bit of the status field of received training frames on the corresponding lane of the interface. Otherwise it is unspecified."
To:
"Boolean variable that reflects the value of local_tf_lock on a lane of the peer interface. The value of remote_tf_lock is set to true if mr_training_enable is true and the "receiver frame lock" bit of the status field of the received training frame is 1 (see Table 178B-4 and Table 178B-5). Otherwise, this variable is set to false."

Implement with editorial license.

*Cl* **178B** *SC* **178B.7.3.1** *P* **857** *L* **38** # 52

Brown, Matt Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(bucket) (CI)*

The variable remote_tp_mode is never used by or set by any state diagram and is never referenced elsewhere.

*SuggestedRemedy*

Delete the entry for remote_tp_mode.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.7.3.1** *P* **857** *L* **45** # 122

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *State diagrams (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the defintion of the slip_done variable
From:
"Boolean variable that is set to true when the SLIP requested by the Training frame lock state diagram (Figure 178B-11) is completed indicating that the next candidate frame sync position can be tested."
To:
"Boolean variable that is true when the next candidate frame sync position can be tested. It is set to true when the SLIP function completes and is set to false upon entering the RESET_COUNT state of the Training frame lock state diagram (see Figure 178B-11)."

Implement with editorial license.

*Cl* **178B** *SC* **178B.7.3.1** *P* **858** *L* **3** # 123

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucketp) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the defintion of the training_failure variable
From:
"Boolean variable that is set to true when training failed to complete. The value of training_failure is set by the training control state diagram (see Figure 178B-10)."
To:
"Boolean variable that is true when training fails to complete. The value of training_failure is set by the training control state diagram (see Figure 178B-10)."

Implement with editorial license.

*Cl* **178B** *SC* **178B.7.3.1** *P* **858** *L* **12** # 488

Slavick, Jeff Broadcom

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

Training frames could use a reference

*SuggestedRemedy*

Add "(see 178B.5.2)" to the end of the definition of the training enumeration.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license..

*Cl* **178B** *SC* **178B.7.3.1** *P* **858** *L* **15** # 487

Slavick, Jeff Broadcom

*Comment Type* **TR** *Comment Status* **A** *(bucket) (CI)*

In Data mode we're transmitting the data from the other sub-layer, not really the AUI component or PMD those have digitized the data, but it's then processed by a PMA/PCS/XS/Inner FEC before being transmitted again.

*SuggestedRemedy*

Change the definintion of data to be "transmit data from the PMA"

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license..

*Cl* **178B** *SC* **178B.7.3.5** *P* **860** *L* **45** # 249

He, Xiang Huawei

*Comment Type* **ER** *Comment Status* **A** *(bucket) (CI)*

the "not equals" sign should be "?" instead of "#".

*SuggestedRemedy*

Change "#" to "?"

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
According to Table 21-1-State diagram operators, not equal sign is ?. Replace # with ?.

*Cl* **178B** *SC* **178B.7.3.5** *P* **860** *L* **45** # 53

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

In Figure 178B-10 operator symbol "#" is used but likely it was intended to be no-equal-to symbol.

*SuggestedRemedy*

Change "#" to not-equal-to symbol.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.7.3.5** *P* **860** *L* **52** # 231

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

there is a variable isl_ready and a state ISL_READY. The variable isl_ready is used in the RTS state diagram. But not appearing in the control state diagram. By definition

*SuggestedRemedy*

change the local_rx_ready and remote_rx_ready after the ISL_READY state to isl_ready

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.8** *P* **863** *L* **16** # 197

Bruckman, Leon — Nvidia

*Comment Type* **T** *Comment Status* **A** *(bucket) (CI)*

Wrong reference for mr_restart, mr_training_enable and training_status

*SuggestedRemedy*

In Table 178B-6 change the references of mr_restart, mr_training_enable and training_status to point to clause 45 and not clause 42.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179** *SC* **179.1** *P* **397** *L* **15** # 370

Kocsis, Sam — Amphenol

*Comment Type* **E** *Comment Status* **A** *(bucket) Wording (E)*

The sentence "Annex 179B specifies test fixtures" implies that the normative annex contains normative requirements for the test fixtures. However, the normative requirements are for the mated test fixtures only, not independent requirements.

*SuggestedRemedy*

Update the sentence to say "Annex 179B specifes the normative requirements for mated test fixtures."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
179B.1 states that the test fixture are specified, and the parameters measured in mated state create implied specifications for each fixture.
Change "Annex 179B specifies test fixtures" to "Annex 179B includes specifications and reference insertion loss for test fixtures".

*Cl* **179** *SC* **179.8.1** *P* **404** *L* **9** # 331

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *Titles (E)*

While I agree that "Specified test points" is a better title for this subclause, I feel that easy navigation of 802.3 comes first. All the other equivalent CR and KR PMD subclauses have the title "Link block diagram".

*SuggestedRemedy*

Rename this subclause to "Link block diagram".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
As stated in the comment, the current title is appropriate for the content of the clause. "Link block diagram" per the suggested remedy does not match the title or the content of the figure included in the subclause (it is not just a block diagram).There are 16 subclauses titled "Link block diagram" in 802.3-2022 (and some additional ones in its amendments), but the term is not defined anywhere and its meaning is unclear. Some of these subclauses include just a diagram; Others specify test points illustrated in a diagram; others include information that would not naturally be described as a link diagram.

While following precedence is a valid consideration, it is not the only one. The standard can evolve and improve, and changes in specific amendments can propagate into future clauses and revisions.

The title of 178.8.1 was changed from "Specified test points" to "Reference test points" as a result of comment #640 againtst D2.0 (see <https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01b_2507.pdf#page=25>, and it is a better description of the contents of that subclause.

To better align titles across subclauses and figures, make the following changes:
In 178.8.1, change the title of Figure 178-2 from "200GBASE-KR1, 400GBASE-KR2, 800GBASE-KR4, or 1.6TBASE-KR8 link" to "200GBASE-KR1, 400GBASE-KR2, 800GBASE-KR4, or 1.6TBASE-KR8 link diagram".
In 179.8.1, change the subclause title from "Specified test points" to "Reference test points"
In 176C.3, change the title of Figure 176C-2 from "Typical 200 Gb/s per lane AUI-C2C application" to "200 Gb/s per lane AUI-C2C link diagram"
Implement with editorial license.

*Cl* **179** *SC* **179.8.1** *P* **404** *L* **10** # 348

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **R** *Test points (E)*

We fixed one issue in 2.1 by saying that the test points where the PMD is "standardized" is at the input and output of test fixtures. But we created another problem because these are not the test points "illustrated in Figure 179-2". I believe the problem is that we are referring to test points (the ones in Figure 179-2) that are not normally accessible, but we are specifying that compliance be measured at test points on test fixtures -- however, we are using the same names for both sets of test points.

*SuggestedRemedy*

We should follow the example in Clause 178; we can have reference test points that are shown in the Figure 179-2, but we should acknowledge that a different set ot test points (with distinct names) are test points at which compliance is measured. For example, TP1v can be the input to a cable assembly test fixture (instead of TP1), TP2v can be the output of a TP2 or TP3 test fixure, etc. Then we can revert to the definitions we had in Table 179-6 that we had in 2.0, but we should not say that these are the test points at which the "PMD sublayer is standardized" (line 10), as that implies that this is where compliance is measured.

*Response* *Response Status* **U**

REJECT.
The test points listed (and described) in Table 179-6 are the same as those illustrated in Figure 179-2.
The naming convention used in KR and C2C clauses, with TP0v and TP5v, is based on the loosely-defined test fixtures. This is different from the CR clauses in which the compliance points are well-defined.

There was agreement that the descriptions in Table 179-6 are correct, but the reference to Figure 179-2 could be improved.

The suggested remedy does not provide a detailed change to the reference to Figure 179-2 that can be implemented.

*Cl* **179** *SC* **179.8.1** *P* **404** *L* **23** # 309

Healey, Adam — Broadcom, Inc.

*Comment Type* **E** *Comment Status* **A** *(bucket) Test points (E)*

In Table 179.8.1 the term "die bump" is used in the definition of TP0d and Tp5d but it is not defined in IEEE Std 802.3 (or in the IEEE P802.3dj draft). Since TP0d and TP5d are also defined in Clause 178 and Annex 176C, use of similar language seems appropriate. Refer to Figure 178-2 for an example.

*SuggestedRemedy*

Replace "die bump" with "device-to-package interface" in the definitions of TP0d and TP5d.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179** *SC* **179.8.1** *P* **404** *L* **39** # 349

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *Test points (E)*

Note 2 refers to Figure 179A-1, which defines TP1, TP2, etc. that is inconsistend with the TP1, TP2, etc. shown in Figure 179-2. This relates to the comment above.

*SuggestedRemedy*

Rename the test points for the test fixures so that they are unique from the reference test points shown in Figure 179-2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
NOTE 2 of Table 179-6 refers to TP1 and TP4. These test points appear in Figure 179-2 and their location is consistent with the definitions in Table 179-6.
However, the indication of the test points in Figure 179-2 can be clarified.

Add the following note at the bottom of Figure 179-2:
NOTE 2-The test points TP1, TP2, TP3, and TP4 are associated with test fixtures as described in Table 179-6.

*Cl* **179** *SC* **179.8.1** *P* **404** *L* **39** # 350

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **R** *(bucketp) (E)*

Notes 3 and 4 define how testing is to be done by pointing to an annex that is informative, not normative. This needs to be in a normative annex or clause.

*SuggestedRemedy*

Describe the test fixtures and compliance test points in a normative clause or annex.

*Response* *Response Status* **U**

REJECT.
The commenter has indicated that subject of the comment should be notes 2 and 3 of Table 179-6. These notes refer to Annex 179A, which is informative.

However, these notes refer to illustrations, which are indeed informative.

There was no consensus to make the suggested change.

*Cl* **179** *SC* **179.8.1** *P* **405** *L* **21** # 394

Ran, Adee — Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

In Figure 179-2, the demarcation lines of PMD, Cable assembly, and PMD should be at the bottom of the diagram (below the newly-introduced "ILT" blocks).

*SuggestedRemedy*

Change the diagram per the comment.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179** *SC* **179.8.9** *P* **407** *L* **9** # 503

Opsasnick, Eugene — Broadcom

*Comment Type* **ER** *Comment Status* **A** *(bucket) (E)*

The first sentence of 179.8.9 states "A PMD shall provide .", but this subclause is specifing the behavior of a specific PMD, not all PMDs.

*SuggestedRemedy*

Change "A PMD shall provide . " to "The PMD shall provide ."
This matches the style of the other 179..8.x function definitions.

*Response* *Response Status* **W**

ACCEPT.

*Cl* **179** *SC* **179.9.4** *P* **408** *L* **8** # 395

Ran, Adee — Cisco Systems

*Comment Type* **E** *Comment Status* **A** *(bucket) (E)*

Article mismatch in "to a 50 O single-ended loads".

*SuggestedRemedy*

Delete "a".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179** *SC* **179.9.4** *P* **408** *L* **31** # 257

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

There appears to be little connection between the
Common-mode to common-mode return loss, RLcc(min)" and "Common-mode to differential-mode return loss, RLdc (min) masks
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 179-7

*SuggestedRemedy*

Remove rows for
Common-mode to common-mode return loss, RLcc(min)
Common-mode to differential-mode return loss, RLdc (min)
Remove sections
179.9.4.8 Common-mode to common-mode return loss
179.9.4.9 Common-mode to differential-mode return loss
Add 3 rows to Table 179-7
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **179** *SC* **179.9.4** *P* **408** *L* **37** # 299

Rysin, Alexander — NVIDIA

*Comment Type* **T** *Comment Status* **R** *Rpeak (E)*

The current limits for Rpeak seem to be placeholders and in some cases (specifically for HN) are not practical. The limits are to be revised based on data collected with sample practical channels.

*SuggestedRemedy*

Change the Rpeak limit for HH from 0.456 to 0.425. Change the Rpeak limit for HN from 0.345 to 0.3.

*Response* *Response Status* **C**

REJECT.

The CRG viewed the presentation <https://www.ieee802.org/3/dj/public/25_09/rysin_3dj_01a_2509.pdf>.

The presentation included results with specific channels that are supposed to be representative of host loss for each class, but did not include calculation of the expected values of Rpeak with the reference host channels.

The value of R_peak should correspond to the reference host channels. Further contributions on this topic are encouranged.

There was no consensus to make the suggested changes at this time.

*Cl* **179** *SC* **179.9.4** *P* **409** *L* **12** # 298

Rysin, Alexander — NVIDIA

*Comment Type* **T** *Comment Status* **R** *Jitter (E)*

J4u measurements at TP2 are highly affected by the effects of slew rate and noise and do not reflect actual uncorrelated jitter. These effects are exacerbated by the characteristics of practical channels between TP0d and TP2 - loss and reflections, and are highly dependent on the transmitted signal amplitude. Accounting only for the faster edges does not work for practical channels at 106.25 Gbd rate and the currently proposed numbers cannot be met (and sometimes cannot be measured) even with commercial test equipment PPG. The issue was demonstrated in rysin_3dj_01a_2407. A new method for JRMS, that largely resolves the demonstrated issue was adopted, yet J4u was not resolved. A different methodology that will better quantify phase-only uncorrelated jitter has to be explored.

*SuggestedRemedy*

Other method of uncorrelated total jitter measurement, that provides a better estimation of the horizontal only jitter, while eliminating the effects of vertical noise, including test equipment noise, should be considered.

*Response* *Response Status* **C**

REJECT.
The suggested remedy does not provide sufficient detail to implement.

*Cl* **179** *SC* **179.9.4** *P* **414** *L* **18** # 300

Rysin, Alexander NVIDIA

*Comment Type* **T** *Comment Status* **R** *SNDR (E)*

SNDR limits for most of the presets cannot be met even with a test equipment PPG with practical host channels. Presentation describing the issue will be submitted.

*SuggestedRemedy*

Revise the SNDR limits based on data collected with practical channels.

*Response* *Response Status* **C**

REJECT.
The CRG viewed the presentation <https://www.ieee802.org/3/dj/public/25_09/rysin_3dj_01a_2509.pdf>.

The presentation includes proposed values for SNDR limits but does not address changing the reference transmitter parameters, which would also affect the COM parameter SNR_TX and thus cable assembly receiver specifications.

There were requests for additional data.
There was no consensus to make the suggested changes.

*Cl* **179** *SC* **179.9.4.1.2** *P* **411** *L* **32** # 205

Brown, Matt Alphawave Semi

*Comment Type* **T** *Comment Status* **R** *(withdrawn)*

The following paragraph is informative since it gives information that is not normative or building upon normative content. In fact, it is talking about a system that violates the normative specifications in this clause.
"Systems with transmitters having steady-state voltage higher than the maximum specified in Table 179-7 are considered engineered links. It is the system integrator's responsibility to verify that the transmitter, receiver, and channel are compatible."
Note that this text was correctly implemented per the adopted response to Draft 2.1 comment #668.

*SuggestedRemedy*

Change the paragraph to an informative note, starting with "NOTE--"

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179** *SC* **179.9.4.1.5** *P* **413** *L* **1** # 206

Brown, Matt Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *cket) Standards language (E)*

A note (preceded with "NOTE--") is an informative statement. The word "may" is normative interpreted as "is permitted to" per the style guide. If this is intended to describe the possibility given the normative specifications, then we can change "may" to "can" (interpreted as "is able to"). If we want to give permission, then it should not be an informative note. The style manual helps us with the latter suggest that the sentence be prefixed with "Note that".

*SuggestedRemedy*

Two solutions are suggested:
#1 Change "may" to "can". (preferred)
#2 Change "Note--Any" to "Note that any"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "may" to "can".

*Cl* **179** *SC* **179.9.4.6** *P* **414** *L* **37** # 277

Kutscher, Noam Marvell

*Comment Type* **T** *Comment Status* **R** *Tx specifications (E)*

The equalization for lanes NOT under test is not defined.

*SuggestedRemedy*

Add the wanted equalization for all lanes NOT under test in all tests:
Differential peak-to-peak output voltage
VCMLF
VCMFB
JRMS
EOJ03
J4u03

*Response* *Response Status* **C**

REJECT.
The comment implies that the equalization setting in adjacent lanes has a significant effect on the result of the parameters mentioned. However, no evidence for the effect has been provided. If the effect is insignificant then this level of specificity is not required.

The suggested remedy does not provide sufficient detail to implement.
There was no consensus to make a change.

*Cl* **179** *SC* **179.9.4.6** *P* **414** *L* **40** # 207

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *cket) Standards language (E)*

The second sentence of the informative note is making a recommendation, which is normative, not informative, as it could mean the test is not properly done otherwise. The style manual helps us out suggesting that instead we use "Note that" if it is normative.

*SuggestedRemedy*

Change "NOTE--Outputs" to "Note that outputs".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The recommendation in the second sentence ("Other circuitry in lanes not under test should be kept active during the measurement") can affect the measurement result and is not just explanatory.

Move the second sentence from the NOTE to the paragraph above it, with editorial license.

*Cl* **179** *SC* **179.9.5** *P* **418** *L* **44** # 258

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

There appears to be little connection between the
Differential-mode to common-mode return loss, RLcd mask
and link performance, as small excursions beyond the mask may show negligible impact.
See Table 179-11

*SuggestedRemedy*

Remove row for
" Differential-mode to common-mode return loss, RLcd (min)
Remove section
179.9.5.6 Receiver differential-mode to common-mode return loss
Add 3 rows to Table 179-11
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **179** *SC* **179.9.5.2** *P* **419** *L* **11** # 208

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **R** *(withdrawn) (bucketp)*

Two concerns with this note. First, the statements are extra information relating to the normative requirements and is worded somewhat normatively; so this should not be an informative note. Secondly, the first sentence is ambiguous as it is the measurement of steady-state voltage as specified in 179.9.4.1.2 that is defined with the transmitter set to preset 1.

*SuggestedRemedy*

Change "NOTE-Steady-state voltage is defined with preset 1. It is not initially generated by a transmitter, due to the initialize setting in Table 179-8."
To "Note that the measurement of steady-state voltage as defined in 179.9.4.1.2 with transmit equalizer set to preset 1 (no equalization), which is not initially generated by a transmitter per initialize setting in Table 179-8 ."

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179** *SC* **179.9.5.3.4** *P* **421** *L* **30** # 209

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **R** *(withdrawn)*

This informative note is providing clarification of a normative specification and thus is not really informative.

*SuggestedRemedy*

Change "Note--The" to "Note that the".

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179** *SC* **179.9.5.4.2** *P* **423** *L* **6** # 271

Kutscher, Noam — Marvell

*Comment Type* **T** *Comment Status* **R** *ITOL/JTOL (E)*

Figure 130a does not represent the correct test setup with TX characteristics at the correct location and noise injection separated from the TX function.

*SuggestedRemedy*

Add the figure from ck, separating the pattern generator and noise injection to supply the COM with 2 S4Ps for the COM to bbn.

*Response* *Response Status* **C**

REJECT.
The comment pertains to the reference to Figure 110-3a.
This figure defines the "Tx test reference" at the output of the block titled "Pattern generator and noise injection".
The suggested remedy is to add a figure from 802.3ck-2022, but that document does not include such a figure - in its Jitter tolerance test procedure subclause (162.9.5.4.2) it refers to the same Figure 110-3a - which is the intended figure.

The comment claims that the figure does not represent the correct test setup, but does not specify what should be corrected. The CRG reviewed the presentation <https://www.ieee802.org/3/dj/public/25_09/kutscher_3dj_01_2509.pdf> which provided additional detail.

Note that the COM calculation for ITOL calibration should use the same channel (from the Tx reference to the Rx reference) for the noise and the victim signal. The Tx reference is after noise injection.

There was no consensus to implement the changes presented.

*Cl* **179** *SC* **179.9.5.4.2** *P* **423** *L* **8** # 168

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *JTOL (E)*

Jitter tolerance test must be performed at max PPM offset

*SuggestedRemedy*

Add followig sentence:
JTOL generator must be at +/-50 PPM from the receiver under test.

*Response* *Response Status* **C**

REJECT.
The requirement to meet jitter tolerance (and other receiver specifications) across the specified frequency range is stated in 179.9.5.1.

[Editor's note: changed page number from 383]

*Cl* **179** *SC* **179.9.5.4.2** *P* **423** *L* **23** # 308

Healey, Adam — Broadcom, Inc.

*Comment Type* **TR** *Comment Status* **A** *(bucket) ITOL/JTOL (E)*

The note below Table 179-13 states the following. "The ADD (Equation (179-14)) and sigmaRJ (Equation (179-15)) calculated from transmitter measurements in this test may be higher than the values in Table 179-19. A suitable channel should be chosen in order to meet the COM requirement with these values." This suggests that a receiver is permitted to be tested with a transmitter that is far outside the limits imposed on compliant transmitters. It also relies on the Channel Operating Margin (COM) calculation being able to correctly evaluate the penalty caused by transmitters with high jitter. The COM calcuation uses a first-order approximation of the noise due to transmitter jitter and the accuracy of this approximation can be expected to degrade for higher levels of jitter. Therefore, it seems likely trade-offs between channel loss/noise and jitter may not a evaluated accurately. The test transmitter, including the added sinusoidal jitter, should be required to meet the JRMS and Jnu03 specifications or the degree to which the test transmitter is allowed to exceed the specifications should be limited.

*SuggestedRemedy*

Remove the note. The requrements of 179.9.5.3.3 (referred to by 179.9.5.4.2) item c) are then expected to apply.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
The measured parameters of the pattern generator, J4u_03 and J_RMS, need to be within the limits in Table 179-7.

Add a statement in 179.9.5.4.1 that the pattern generator with SJ insjection complies with EOJ03, J4u03, and JRMS in Table 179-7.
Apply similar changes in the JTOL subclauses in Clause 178, Annex 176C, and Annex 176D.
Implement with editorial license.

*Cl* **179** *SC* **179.9.5.4.2** *P* **423** *L* **24** # 210

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *ITOL/JTOL (E)*

This informative note is providing further detail of a normative specification with a recommendation and thus is not really informative. Also, the word "may" (interpreted as "is permitted to") is incorrect; the proper word is "can" (interpreted as "is possible").

*SuggestedRemedy*

Change the first sentence in the note to "Note that the ADD (Equation (179-14)) and sRJ (Equation (179-15)) calculated from transmitter measurements in this test can be higher than the values in Table 179-19."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Per subclause 18.1 of the IEEE SA Style Manual: "Notes are explanatory statements used in the text for emphasis or to offer informative suggestions about the technical content of the standard. Notes provide additional information to assist the reader with a particular passage and shall not include mandatory requirements."
The note subject of the comment describes the implication of the normative jitter injection combined with requirements in the first paragraph ("The test channel COM... shall not be lower than the value..."), and does not include mandatory requirements beyond it. Therefore, it adheres to the style manual.

However, the word "may" is not intended to give premission, and is inconsistent with the similar NOTE in 176D.8.13.2.

Change "may" to "can".

*Cl* **179** *SC* **179.9.5.6** *P* **423** *L* **44** # 170

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *Mode conversion (E)*

The current RLdc limit is too tight at TP4a

*SuggestedRemedy*

Assuming we want single RLdc to cover both TP1a and TP4a then following equation shoul be used:
RLdc=23-22*f/(106.25) up to 53.125 GHz
= 12 dB from 53.125 to 67 GHz
The current limit can work for TP1a RLdc if we want to create two graphs, this is due to HCB higher loss.
see ghiasi_3dj_03_2509

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment mentions RLdc at TP4a. The commenter clarified that the intent is both the HCB test points (TP1a in Annex 176D, TP2 and TP3 in Clause 179) and MCB test points (TP4 in Annex 176D, TP1 and TP4 in Clause 179).

Resolve using the response to comment #169.

*Cl* **179** *SC* **179.11** *P* **425** *L* **20** # 317

Ellison, Jason — TE Connectivity

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

The current SCMR specification limit of 20 has proven to be overly stringent and is not consistently achievable with production-level components.
Based on empirical data and manufacturing capability assessments, a revised target of 11 is recommended to ensure feasibility without compromising functional performance.
Reducing the specification to 11 will align design intent with realistic production tolerances and improve yield across standard manufacturing processes in table 179-14

*SuggestedRemedy*

Change the SCMR limit to 11 in table 179-14. A supporting contribution is planned for the September interim meeting.

*Response* *Response Status* **W**

REJECT.
The comment pertains to SCMR_CH.

The CRG reviewed the presentation <https://www.ieee802.org/3/dj/public/25_09/ellison_3dj_01a_2509.pdf>.
It was indicated that more information is required, including correlation with COM and assessment of the differential and common-mode responses. A future contribution would be encouraged.

There was no consensus to make the suggested change.

*Cl* **179** *SC* **179.11** *P* **425** *L* **25** # 358

Heck, Howard — TE Connectivity

*Comment Type* **TR** *Comment Status* **R** *ILdd (E)*

Cable assembly TP1-TP4 insertion loss specifications are proving challenging to meet when accounting for all sources of variation, specifically for the CA-A and CA-B cable assembly classes. A more manufacturable specification needs an additional 1 dB insertion loss to be allocated to the cable assembly for CA-A and CA-B.

*SuggestedRemedy*

Summary: Reduce the insertion loss allocation for all three host classes (HL/HN/HH) by 0.5 dB (Table 179A-1). Increase the TP1-TP4 cable assembly insertion loss (Table 179-14) for CA-A from 19 dB to 20 dB, and for CA-B from 24 dB to 25 dB. Change the partial host PCB trace lengths in Table 179-19 to provide the host loss reduction. A contribution to support the comment and proposed change that includes all specific proposed changes is planned for the September interim meeting.

*Response* *Response Status* **U**

REJECT.
The CRG has reviewed the contribution <https://www.ieee802.org/3/dj/public/25_09/heck_3dj_02a_2509.pdf>.

The discussion indicated that the proposed changes in this comment, combined with those of comment #357, would affect the PMD specifications, and may make host compliance more challenging.

There was no consensus to implement the susggested changes at this time. Further contributions with consensus building are encouraged.

See also the response to the related comment #357.

*Cl* **179** *SC* **179.11** *P* **425** *L* **29** # 360

Noujeim, Leesa — Google

*Comment Type* **TR** *Comment Status* **R** *ILdd (E)*

The 16dB minimum insertion loss of cable assembly will prevent deployment of ultra-short cables which may for example be used to jumper between adjacent ports on adjacent systems (eg rack slot 1 to rack slot 2). Such cables may have only incremental loss, eg 2dB, beyond the ~12dB allocated for MCB+connectors, particularly at low-loss environmental (cold) and manufacturing corners.

*SuggestedRemedy*

Change 16dB to 14dB

*Response* *Response Status* **C**

REJECT.
Reducing the minimum loss has the implication of requiring receiver testing with a lower loss cable. This requires such cables to be generally available for testing purposes, and possibly increases the burden on receivers (shorter is not necessarily easier). There is no indication that such cables are available, nor data to check the feasibility of reference receivers working with such cables.

There are several comments suggesting that available MCBs have lower IL than the reference by about 1 dB, and proposing reduction of the reference. This may be related to the perceived lower IL of cable assemblies (by about 2 dB). However, these comments were not accepted.

There was not consensus to make the suggested change.

*Cl* **179** *SC* **179.11** *P* **425** *L* **32** # 259

Mellitz, Richard Samtec

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

There appears to be little connection between the
" Differential-mode to common-mode return loss, RLcd (min)" and "Common-mode to common-mode return loss, RLcc" masks
to performance in Table 179-14.and link performance, as small excursions beyond the mask may show negligible impact.

*SuggestedRemedy*

Remove rows for
'Differential-mode to common-mode return loss, RLcd (min)"
"Common-mode to common-mode return loss, RLcc" (min)"
Remove sections
179.11.4 Differential-mode to common-mode return loss
179.11.6 Common-mode to common-mode return loss
Add 3 rows to Table 179-14
ERL_CC(min) = 5 dB
ERL_CD(min) = 20 dB
ERL_DC(min) = 20 dB
Reference: " Modal ERL and modal Return Loss" appendix

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #253.

*Cl* **179** *SC* **179.11** *P* **425** *L* **33** # 260

Mellitz, Richard Samtec

*Comment Type* **TR** *Comment Status* **A** *Mode conversion (E)*

In table 179-14 the rows:
Mode conversion insertion loss
Are referring to same impairment as SCMR_CH
In Table 179-14, the rows are labelled:
Mode conversion insertion loss appears to describe a impairments already captured by the SCMR_CH metric. Both are like SNR as the delta is like an SNR.
In addition, there appears to be little connection between the ILcd and ILdc masks and link performance, as small excursions beyond the mask may show negligible impact.

*SuggestedRemedy*

In table 179-14
Remove rows for:
Mode conversion insertion loss
Remove section:
179.11.5 Mode conversion insertion loss
add
SCMR_DC_CH to table
In table 179-14: add rows for:
SCMR_DC_CH (min) = 20 dB

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The new SCMR_CH limits differential to common mode conversion, so it can replace the "ILcd-ILdd" mask.
The CRG discussion suggested that ILcd and ILdc are typically close to each other, and since the CM input to the channel is specified to be at least 20 dB lower than the differential input, it would be safe to only limit the differential-to-common-mode conversion.

In table 179-14, remove rows for mode conversion insertion loss
Remove section 179.11.5 (Mode conversion insertion loss).

Add SCMR_CH specifications (similar to those in Clause 179) to Clause 178 and Annex 176C, replacing the existing "Mode conversion insertion loss" frequency masks.

Implement with editorial license.

*Cl* **179** *SC* **179.11.8** *P* **433** *L* **40** # 396

Ran, Adee
Cisco Systems

*Comment Type* **E** *Comment Status* **A** *icket) Document structure (E)*

The new SCMR_CH specification is relevant for all electrical channels, not just to cable assemblies. Its location under 179.11 is not ideal, and it is possible that other electrical channel specifications will also include this parameters.
Annex 178A, titled "Specification methods for 200 Gb/s per lane electrical channels", is a more appropriate place.

*SuggestedRemedy*

Move the content of 179.11.8 to a new subclause 178A.2.
Update the existing reference in Table 179-14 accordingly.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

---

*Cl* **179** *SC* **179.11.8** *P* **434** *L* **35** # 397

Ran, Adee
Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *Mode conversion (E)*

The definition of VCM_CH as being the "peak up to DER0" is not justified. The intent is to limit the common-mode signal at the receiver input; the effect on receivers is design dependent and is not addressed by COM (it is not an additive noise source), so DER0 is irrelevant.

SCMR_CH limits the conversion of the (strong) differential input signal to a common-mode signal. If the channel can create much higher common-mode output at this probability, it could create errors in the receiver that are not necessarily uncorrelated. Thus the limit should be at a much lower probability. For transmitter common-mode noise specifications we use 1e-7 (see 176D.8.1) because of the reasoning above. The same value should be used here.

*SuggestedRemedy*

In Equation 179-29, change from "DER0" to 1e-7.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The commenter indicated that the comment pertains to SCMR_CH, not VCM_CH as written.

The CRG discussed the comment. There was general support to the direction of the comment, but it was indicated that the limit values of SCMR_CH will need to be re-evaluated if the change is applied.

Implement the suggested remedy in all instances of SCMR_CH, with editorial license.

---

*Cl* **179** *SC* **179.15** *P* **438** *L* **3** # 65

Brown, Matt
Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *PICS (E)*

Per editor's note, the PICS is incomplete.

*SuggestedRemedy*

Complete the PICS with editorial license and delete editor's note.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **179A** *SC* **179A** *P* **870** *L* **20** # 425

Sekel, Steve
Wilder Technologies

*Comment Type* **TR** *Comment Status* **R** *Test fixture reference (E)*

(Note: this same comment changes several values in three figures. A sepeaate entry for each page and line number requiring change is entered. The comment text will be duplicated on each line number requiriring change.)
The ILdd allocated to the module connector in Figure 179A-1 Host-Nominal to Host-Nominal, Cable Assembly, and test fixture insertion loss @ 53.125 GHz is excessive. Test fixtures built with second generation OSFP connectors from multiple vendors show the connector loss allocation to be approximately 1.4 dB less than as illustrated. To allow loss budget allocation for other form factors, the recommended correction is 1.0 dB.
Note that because the host allocation is the sum of the trace loss and the connector loss, and only the connector value is changing, this will not change the maximum host channel reach.

*SuggestedRemedy*

change the loss from TP1/TP4 to the Paddle / Wire Termination from 5.95 dB to 4.95 dB.

*Response* *Response Status* **W**

REJECT.
Resolve using the response to comment #357.

*Cl* **179A** *SC* **179A** *P* **870** *L* **28** # 426

Sekel, Steve — Wilder Technologies

*Comment Type* **TR** *Comment Status* **R** *Host classes (E)*

The ILdd allocated to the module connector in Figure 179A-1 Host-Nominal to Host-Nominal, Cable Assembly, and test fixture insertion loss @ 53.125 GHz is excessive. Test fixtures built with second generation OSFP connectors from multiple vendors show the connector loss allocation to be approximately 1.4 dB less than as illustrated. To allow loss budget allocation for other form factors, the recommended correction is 1.0 dB.
Note that because the host allocation is the sum of the trace loss and the connector loss, and only the connector value is changing, this will not change the maximum host channel reach.

*SuggestedRemedy*

change the Host Channel loss values from 13.95 dB to 12.95 dB, and the HCB TP2/TP3 loss values from 3.8 dB to 4.8 dB.

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #357.

*Cl* **179A** *SC* **179A** *P* **870** *L* **38** # 427

Sekel, Steve — Wilder Technologies

*Comment Type* **TR** *Comment Status* **R** *Test fixture reference (E)*

The ILdd allocated to the module connector in Figure 179A-1 Host-Nominal to Host-Nominal, Cable Assembly, and test fixture insertion loss @ 53.125 GHz is excessive. Test fixtures built with second generation OSFP connectors from multiple vendors show the connector loss allocation to be approximately 1.4 dB less than as illustrated. To allow loss budget allocation for other form factors, the recommended correction is 1.0 dB.
Note that because the host allocation is the sum of the trace loss and the connector loss, and only the connector value is changing, this will not change the maximum host channel reach.

*SuggestedRemedy*

change MCB + connector loss (TP1 side) from 5.95 dB to 4.95 dB. Change the TP2 to HCB loss from 3.8 dB to 4.8 dB.

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #357.

*Cl* **179A** *SC* **179A** *P* **871** *L* **11** # 428

Sekel, Steve — Wilder Technologies

*Comment Type* **TR** *Comment Status* **R** *Host classes (E)*

The ILdd allocated to the module connector in Figure 179A-1 Host-Nominal to Host-Nominal, Cable Assembly, and test fixture insertion loss @ 53.125 GHz is excessive. Test fixtures built with second generation OSFP connectors from multiple vendors show the connector loss allocation to be approximately 1.4 dB less than as illustrated. To allow loss budget allocation for other form factors, the recommended correction is 1.0 dB.
Note that because the host allocation is the sum of the trace loss and the connector loss, and only the connector value is changing, this will not change the maximum host channel reach.

*SuggestedRemedy*

change the TP0d/TP5d Host Channel loss from 13.95 dB to 12.95 dB.

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #357.

*Cl* **179A** *SC* **179A** *P* **871** *L* **14** # 429

Sekel, Steve — Wilder Technologies

*Comment Type* **TR** *Comment Status* **R** *Host classes (E)*

The ILdd allocated to the module connector in Figure 179A-1 Host-Nominal to Host-Nominal, Cable Assembly, and test fixture insertion loss @ 53.125 GHz is excessive. Test fixtures built with second generation OSFP connectors from multiple vendors show the connector loss allocation to be approximately 1.4 dB less than as illustrated. To allow loss budget allocation for other form factors, the recommended correction is 1.0 dB.
Note that because the host allocation is the sum of the trace loss and the connector loss, and only the connector value is changing, this will not change the maximum host channel reach.

*SuggestedRemedy*

Change "Channel Max (TP0d-TP5d) ILdd = 40 dB @ 53.12 GHz = (2 * 13.95) + 12.1"
to "Channel Max (TP0d-TP5d) ILdd = 40 dB @ 53.12 GHz = (2 * 12.95) + 14.1"

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #357.

*Cl* **179A** *SC* **179A.4** *P* **868** *L* **50** # 198

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *Host classes (E)*

The Host channel low loss range in Table 179A-1 is included in the Host nominal loss range and in the Host high loss range.
The Host channel nominal loss range is included in the Host channel high loss range.
This makes the host channel class assignment ambigous, not clear what should be reported by a port that its loss is e.g. 7 dB.

*SuggestedRemedy*

Change the host channel loss ranges in table 179A-1 to (in dBs):
HL: 4 to 9
HN: 8 to 14
HH: 13 to 19
or to other ranges that are not fully included in each other

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Annex 179A is informative, and the table provides information above loss ranges. Host classes are not defined based on the host channel insertion loss (which cannot be verified), but based on the compliance requirements in 179.9.4 and 179.9.5, which are separate for transmitter and receiver.
As an examble, a host can have a low loss channel with a transmitter that enables compliance with class HL, but its receiver might only meet the class HN requirements. Such a host can be stated as compliant with class HN.
This rationale should be explicitly stated in the PMD clause and in the informative annex.

In 179.9, add text to clarify that PMD compliance with one of the three host classes is defined by meeting the requirements in both 179.9.4 (Tx) and 179.9.5 (Rx) on all lanes for that host class.
Add a NOTE that a PMD can comply with one or more host classes.
In 179A.4, change the first sentence from
"The recommended differential insertion loss at 53.125 GHz for the host channels, consisting of controlled impedance PCB, device package, and mated host connector, are given in Table 179A-1 and illustrated in Figure 179A-1"
to
"The host channel, consisting of controlled impedance PCB, device package, and mated host connector, is illustrated in Figure 179A-1. The host channel does not include the TP2 or TP3 test fixture PCB. The recommended maximum differential insertion loss at 53.125 GHz for each host class is given in Table 179A-1."

In 179A.4, add a reference to 179.9 with appropriate text.

In Table 179A-1, change the 2nd column from range to max, and move the min recommendation to the subclause text.

Implement with editorial license.

*Cl* **179A** *SC* **179A.4** *P* **868** *L* **50** # 70

Lusted, Kent — Synopsys

*Comment Type* **T** *Comment Status* **A** *Host classes (E)*

In Table 179A-1, the recommended differential insertion loss limits for the three host classes have overlapping "host channel ranges" and overlapping "max (dB)" values. For a host that has a TP0d-to-TP2 loss of 10 dB, it is unclear which host class is the appropriate one. While it is possible to leave it to the user/reader to deal with, better guidance would enhance the interoperability of the three hosts with the four cable classes.

*SuggestedRemedy*

Revise Table 179A-1 as follows:
Set the host channel range for HN = 8.95 to 13.95, HH = 13.95 to 18.95

In the third column, change "Max (dB)" to "Range (dB)"
Set HL range of 8.25 to 12.75
Set HN range of 12.75 to 17.75
Set HH range of 17.75 to 22.75

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #198.

*Cl* **179A** *SC* **179A.5** *P* **870** *L* **38** # 357

Heck, Howard — TE Connectivity

*Comment Type* **TR** *Comment Status* **R** *Test fixture reference (E)*

Comment #140 against D1.4 resulted in a change to Figure 179A-1 that resulted in the loss of the MCB PCB and the via+connector being lumped into a single value. This has the unintended consequence of requiring adjustment to the MCB PCB design to compensate for any difference in via+connector insertion loss from the amount allocated to it prior to D1.5, which can increase the amount of MCB trace loss included in a TP1-TP4 cable assembly measurement.

Specifics: The MTF loss specified in the lower left of Figure 179A-1 specifies values for TP1-TP2 (9.75 dB), the HCB from TP2 to the via+connector (3.8 dB), and the MCB from TP1 (5.95 dB) to the far side of the via+connector (the same point as for the HCB). The MCB loss specification therefore includes PCB, PCB via and the via+connector. Up through D1.4, the MCB loss was specified as PCB only with a value of 2.7 dB, effectively allocating 3.25 dB for the via+connector. Existing MCB designs with which all cable assemblies have been measured were designed to the 2.7 dB trace insertion loss. Hardware measurements are showing 1 dB or more lower loss for the via+connector. Since the MCB loss includes the via+connector, the MCB traces now require 1 dB additional loss to compensate for the lower via+connector loss. This additional MCB loss increases the MCB loss in a TP1-TP4 cable assembly measurement by 2 dB, effectively reducing cable assembly portion of the loss by 2 dB (2 MCBs in a measurement), compromising the ability to meet the existing TP1-TP4 insertion loss specs.

*SuggestedRemedy*

Change Figure 179A-1 by either 1) reverting to the version that was in D1.4 (as proposed in D2.0 Comment #289) or 2) increasing TP2-to-connector to 4.8 dB and reducing TP1-to-connector 'far side' to 4.95 dB. Note that neither option proposed affects the insertion loss allocation for cable assembly or hosts.
A supporting contribution is planned for the September interim meeting.

*Response* *Response Status* **U**

REJECT.

The CRG has reviewed the contribution <https://www.ieee802.org/3/dj/public/25_09/heck_3dj_01b_2509.pdf>.

The following straw poll was taken:
Straw poll #E-2 (directional) (choose one)
I support the general direction of changing the loss allocations e.g. as in option 2 in heck_3dj_01b_2509.
Y: 22 N: 20 A: 10

The CRG discussion indicated some support for the direction proposed in heck_3dj_01b_2509, but a more complete proposal (e.g. with the necessary changes in the normative Annex 179B and Clause 179) is required.
Continued work and consensus building is encouraged.

There is no consensus to make the proposed changes at this time.

*Cl* **179A** *SC* **179A.5** *P* **870** *L* **40** # 356

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *Test points (E)*

"The MCB and HCB ILdd allocations include the RF connector (up to the RF connector reference plane)." The RF connector is not well defined and is not identified in the figure. Elsewhere it is referred to as "coaxial connector" (e.g., 179.9.4.7, p. 416, line 9; p.423, line 31; p.426, line 13, etc). I cannot find a desciption of test board in any normative part of the document.

*SuggestedRemedy*

Add a label (or labels) pointing to the RF connector(s) in Figure 179A-1. Put a decription of the test boards in a normative part of the document. Name these RF ports consistently (e.g., either coaxial connector or RF connector or something else).

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
The suggested remedy asks for a description of the test boards, but details of the requested description are not provided. A description of the test boards is already provided in Annex 179B, which is normative.
However, the connector labeling should be made consistent.

In Figure 179A-1 change "RF connector" to "coaxial connector".
In 179B.2.1 change "RF test connector" to "coaxial connector".

*Cl* **179B** *SC* **179B.2.1** *P* **873** *L* **32** # 363

Kocsis, Sam — Amphenol

*Comment Type* **T** *Comment Status* **R** *Test fixture reference (E)*

Annex 179B is normative, while the TP2/TP3 test fixture insertion loss is defined as a reference only. This point seems to be causing confusion among readers regarding the conformance criteria.

*SuggestedRemedy*

Move section 179B.2.1 to 179A, which is an informative annex, to an appropriate location in the annex.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179B** *SC* **179B.2.1** *P* **873** *L* **40** # 444

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *Test fixture reference (E)*

Equation 179B-1 leads to 3.66dB at 53.125GHz. 179A-1 shows that it should be 3.8dB

*SuggestedRemedy*

Change the 0.3221f to 0.3251f

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #365.

*Cl* **179B** *SC* **179B.2.1** *P* **873** *L* **40** # 365

Kocsis, Sam — Amphenol

*Comment Type* **T** *Comment Status* **A** *Test fixture reference (E)*

Equation 179B-1, as plotted in Figure 179B-1 does not seem to track the insertion loss profile of an actual test fixture.

*SuggestedRemedy*

Update Equation 179B-1 and Figure 179B-1 with a more representative profile. Contribution to follow at the September Interim.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment pertains to the TP2/TP3 test fixture (HCB).

The CRG has reviewed the contribution <https://www.ieee802.org/3/dj/public/25_09/kocsis_3dj_01_2509.pdf>.

Implement the suggested change to Equation 179B-1 on slide 5 of kocsis_3dj_01_2509, and update Figure 179B-1 accordingly.
Implement with editorial license.

*Cl* **179B** *SC* **179B.3.1** *P* **874** *L* # 424

Sekel, Steve — Wilder Technologies

*Comment Type* **TR** *Comment Status* **R** *Test fixture reference (E)*

The ILdd allocated to the module connector in Figure 179A-1 Host-Nominal to Host-Nominal, Cable Assembly, and test fixture insertion loss @ 53.125 GHz is excessive. Test fixtures built with second generation OSFP connectors from multiple vendors show the connector loss allocation to be approximately 1.4 dB less than as illustrated. To allow loss budget allocation for other form factors, the recommended correction is 1.0 dB.
Note that because the host allocation is the sum of the trace loss and the connector loss, and only the connector value is changing, this will not change the maximum host channel reach.

*SuggestedRemedy*

In Figure 179B-1, rescale ILddtfref to intersect at 53.125 GHz from 3.8 dB to 4.8 dB

*Response* *Response Status* **U**

REJECT.
The comment is related to comment #357 and similar to other comments.
Note that even if the other comments are accepted, the suggested remedy for this comment does not provide enough detail to implement an equation. A contribution with more detail would be welcome.
Resolve using the response to comment #357.

*Cl* **179B** *SC* **179B.3.1** *P* **874** *L* # 430

Sekel, Steve — Wilder Technologies

*Comment Type* **TR** *Comment Status* **R** *Test fixture reference (E)*

The ILdd allocated to the module connector in Figure 179A-1 Host-Nominal to Host-Nominal, Cable Assembly, and test fixture insertion loss @ 53.125 GHz is excessive. Test fixtures built with second generation OSFP connectors from multiple vendors show the connector loss allocation to be approximately 1.4 dB less than as illustrated. To allow loss budget allocation for other form factors, the recommended correction is 1.0 dB.
Note that because the host allocation is the sum of the trace loss and the connector loss, and only the connector value is changing, this will not change the maximum host channel reach.

*SuggestedRemedy*

In Figure 179B-1, rescale ILddcatfref to intersect at 53.125 GHz from 5.95 dB to 4.95 dB

*Response* *Response Status* **U**

REJECT.
The comment is related to comment #357 and similar to other comments.
Note that even if the other comments are accepted, the suggested remedy for this comment does not provide enough detail to implement an equation. A contribution with more detail would be welcome.
Resolve using the response to comment #357.

*Cl* **179B** *SC* **179B.3.1** *P* **874** *L* **13** # 364

Kocsis, Sam — Amphenol

*Comment Type* **T** *Comment Status* **R** *Test fixture reference (E)*

Annex 179B is normative, while the cable assembly test fixture insertion loss is defined as a reference only. This point seems to be causing confusion among readers regarding the conformance criteria.

*SuggestedRemedy*

Move section 179B.3.1 to 179A, which is an informative annex, to an appropriate location in the annex.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **179B** *SC* **179B.3.1** *P* **874** *L* **15** # 443

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *ket) Test fixture reference (E)*

Equation 179B-2 leads to -34.26dB at 53GHz. An obvious problem as the value per figure 179A-1 should be 5.95dB

*SuggestedRemedy*

Change the 0.841f to 0.0841f

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
The comment identifies an editorial error in translating the equation for D2P1. There are technical implications wiht the error, but the suggested remedy provides the right corrective action.
Implement the suggested remedy.

---

*Cl* **179B** *SC* **179B.3.1** *P* **874** *L* **19** # 442

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(bucket) Test points (E)*

The cable assembly test fixture includes the connector, vias, etc.

*SuggestedRemedy*

Delete "PCB" from "test fixture PCB reference"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment identifies an inconsistency in the nomenclature.
However, the text fixture should be referenced correctly.

Change "test fixture PCB reference" to "cable assembly test fixture reference".
Update the details of the structures included in the cable assembly test fixture in the text of 179B.3.1.
Implement with editorial license.

---

*Cl* **179B** *SC* **179B.4.1** *P* **825** *L* **11** # 359

Noujeim, Leesa — Google

*Comment Type* **TR** *Comment Status* **R** *ILdd (E)*

The 5dB difference between ILddMTF_min and _max results in unreasonably high uncertainty in cable assembly IL at fNyquist

*SuggestedRemedy*

Tighten the spread to ~2dB.

*Response* *Response Status* **W**

REJECT.
The comment identifies an area for potential improvement in the current draft. However, the suggested remedy does not provide sufficient detail to implement.
A contribution with a detailed proposal would be helpful for the CRG to drive consensus on a specific change.

*Cl* **179B** *SC* **179B.4.2** *P* **875** *L* **33** # 366

Kocsis, Sam — Amphenol

*Comment Type* **E** *Comment Status* **A** *ket) Test fixture reference (E)*

Equation 179B-5, as plotted in Figure 179B-2 provides a reference insertion loss for the mated test fixture, without any context.

*SuggestedRemedy*

Add text, or a note that specifies that Equation 179B-5 is the sum of Equations 179B-1 and 179B-2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add the following NOTE after the parameter list that follows equation 179B-5:
NOTE---ILDD_MTFref is equal to the sum of ILdd_tref in Equation (179B-1) and ILdd_catref in Equation (179B-2).

*Cl* **179B** *SC* **179B.4.3** *P* **877** *L* **24** # 367

Kocsis, Sam — Amphenol

*Comment Type* **T** *Comment Status* **R** *ERL (E)*

In D2P1, both the s-parameter reference impedance and the ERL reference impeance are now 92.5-ohm differential (46.25-ohm single-ended). The RF connectors used in MTF measurements introduce a significant impact to the computed ERL result, making a limit of 10.3dB very challenging to achieve.

*SuggestedRemedy*

Change the ERL limit to account for the deltaERL with the RF coax connector, OR allow for a fixed Tfr setting to remove the impact of the RF coax connector. Contribution to follow at the September Interim.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179B** *SC* **179B.4.5** *P* **879** *L* **7** # 368

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

The extrapolation of common-mode to common-mode return loss requirements for the MTF based on KR/CR/C2M common-mode to common-mode may have been too aggressive. Channels with fixtures that "pass" KR/CR/C2M requirements, still fail the MTF requirements.

*SuggestedRemedy*

Change Equation 179B-7 and Figure 179B-4 to be compatible with test fixtures used in KR/CR/C2M compliance settings. Contribution to follow at the September Interim.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179B** *SC* **179B.4.6** *P* **880** *L* **7** # 369

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **R** *Mode conversion (E)*

The extrapolation of common-mode to differential-mode return loss requirements for the MTF based on KR/CR/C2M common-mode to differential-mode may have been too aggressive. Channels with fixtures that "pass" KR/CR/C2M requirements, still fail the MTF requirements.

*SuggestedRemedy*

Change Equation 179B-8 and Figure 179B-5 to be compatible with test fixtures used in KR/CR/C2M compliance settings. Contribution to follow at the September Interim.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179B** *SC* **179B.4.6** *P* **880** *L* **7** # 169

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *Mode conversion (E)*

The current RLdc limit is too tight at TP4a

*SuggestedRemedy*

Assuming we want single RLdc to cover both TP1a and TP4a then following equation shoul be used:
RLdc=26-22*f/(106.25) up to 53.125 GHz
= 15 dB from 53.125 to 67 GHz
Alternatively TP1a RLdc can be improved by 2 dB due to HCB higher loss and that would requrie two graphs
see ghiasi_3dj_03_2509

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG has reviewed the contribution
<https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_03a_2509.pdf>.

Implement the suggested changes to the equations on slide 3 of ghiasi_3dj_03a_2509, and updated the relevant figures accordingly, in Clause 179 and Annex 179B.

Implement with editorial license.

*Cl* **180** *SC* **180.1** *P* **443** *L* **38** # 433

Nicholl, Gary — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(bucket) AUI (O)*

In Table180-1, footnote c also applies to 200GAUI-2 C2C and 200GAUI-2 C2M. When implemented in a 200GBASE-DR1 PHY the signalling rate of these AUIs must also be constrained as defined in 120.1.4 (i.e. to 50ppm).

Same comment for Table 180-2..

*SuggestedRemedy*

Update Table 180-1 and Table 180-2 , to add footnote c to 200GAUI-2 C2C and 200GAUI-2 C2M (Table 180-1) and 400GAUI-4 C2C and 400GAUI-4 C2M (Tabe 180-2).

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

*Cl* **180** *SC* **180.5.2** *P* **450** *L* **48** # 435

Nicholl, Gary — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *ILT (CI)*

With respect to the sentence "When operating in TRAINING mode, the PAM4 symbol stream on each lane is taken from the output of the training pattern generator in the PMD control function (see Figure 178B.4)" It is not clear what "lane" is referring to in this sentence . Is it the .PMD:IS_UNITDATA_i.request input lane from the service interface , or does it mean the SLi lane at the outout of the PMD transmit funciton ? Also the sentence refers to a "training pattern generator in the PMD control function (See Figure 178B.4) " . There is no "PMD control function" shown in either Figure 180-2 or in Figure 178B-2 ? The term "PMD control function" does appear anywhere else in clause 180 or in 178B. Is the "training pattern generator" assumed to part of the "PMD transmit Function" block in Figure 180-2 or the "per-lane ILT function block" in Figure 178B-2

It sounds like in training mode a PAM4 signal from a traning pattern generator (located somehwere) is converted to an optical signal and delivered to the MDI ?

*SuggestedRemedy*

Change from:
"When operating in TRAINING mode, the PAM4 symbol stream on each lane is taken from the output of the training pattern generator in the PMD control function (see Figure 178B.4)."
to:
"When operating in TRAINING mode, each source lane of the MDI (SLi) is replaced with a PAM4 optical symbol stream derived from a training pattern generator (add a reference here) "

An alternative approach would be to simplfy both paragraphs along the lines of:
"When operating in DATA mode, the PMD Transmit Function converts a symbol stream from PMD:IS_UNITDATA_i to a correpsonding optical signal on source lane SLi on the MDI.

When operating in TRAINING mode, the PMD Transmit Function converts a PAM4 symbol stream from a training pattern generator (add reference here) to a coresponding optical signal on each source lane SLi on the MDI"

Make similar and appropriate changes to 181.5.2, 182-2.5.2, 183.5.2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change "PMD control function" to "ISL training function" to match the subclause title (178B.5).

Update the reference from "Figure 178B.4" to "(see 178B.5 and Figure 178B-5)".

Apply in other PMD and AUI clauses where appropriate.

Implement with editorial license.

---

*Cl* **180** *SC* **180.6** *P* **452** *L* **43** # 436

Nicholl, Gary — Cisco Systems

*Comment Type* **T** *Comment Status* **R** *(bucket) MDI (O)*

This is more of a question for clarification. I wanted to clarify that this subclause is only assigning optical lanes at the MDI. It is not attempting to place any restriction on the mapping between eleectrical lanes (on the AUI-n) and optical lanes at the MDI ?

The whole point of the MLD based PCS is to allow both host and module implementors flexibility in the routing and mapping of both electrical and optical lanes.

*SuggestedRemedy*

Clarify that we are not placing any restrictions on the mapping between electrical lanes from the AUI-n to optical lanes on the MDI.

*Response* *Response Status* **C**

REJECT.
There could be a gearbox between the AUI and the optical PMD, therefore, it is not necessarily a one-to-one relation. However, the suggested remedy does not provide sufficient detail to implement.

---

*Cl* **180** *SC* **180.7.1** *P* **453** *L* **31** # 57

Brown, Matt — Alphawave Semi

*Comment Type* **ER** *Comment Status* **A** *Editorial (O)*

Associated with most parameters in the transmit and receive characteristics tables there is also a subclause definition the parameter and related test methods. In Clause 180 the transmitter and receiver characteristics are specified in Table 180-7 and Table 180.8, respectively. The parameters are defined in subclauses under subclause 180.9. In the characteristic tables a cross-reference to the associated subclause would be very helpful to the reader and would ensure that the details of the parameter are obvious. As an example, the table summarizing parameters for KR transmitter parameters, Table 178-6, has a column with the cross-reference to the associated definition subclause. A similar approach for optical transmitter and receiver characteristic tables is suggested.

*SuggestedRemedy*

In Table 187-7 and Table 187-8, for each parameter (row) provide a cross-reference to the subclause that defines the parameter. For instance, in Table 180-7, for lane wavelength reference 180.9.2.
Similarly update tables in clauses 181, 182, 183, 185, and 187.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

---

*Cl* **180** *SC* **180.7.1** *P* **453** *L* **31** # 399

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *itter for optical interface (CO)*

Clock jitter, especially at low frequencies, is not captured adequately by existing optical PMD transmitter specifications, and should be limited by separate specifications to avoid correlated errors in receivers that would degrade link performance.

Methods for jitter measurements are available in oscilloscopes and are used successfully in electrical transmitters. The same methods can be used for optical transmitters.

Note that jitter measurement is faster than a "functional receiver" test, and is more reliable, because the CRU bandwidth in oscilloscopes scope is tightly controlled.

A presentation with measured data in a controlled experiment, demonstrating that high jitter levels significantly degrade FEC performance while having an insignificant effect on TDECQ, will be provided.

This specification should apply to transmitters in all IM-DD PMDs.

*SuggestedRemedy*

In Table 180-7, add an "Output jitter" row with parameters and units as in Table 176D-3 (module output specifications at TP4). For maximum values, use the values in 176D-3 except that J4u03 is increased by 10% (relaxed) to account for higher measurement noise.

In Table 180-14, add a new test pattern 8, PRBS9Q, defined in 176.7.4.4.
In Table 180-14, add an "Output jitter" row with pattern 4, 6, or 8, and reference to 180.9.14 (new subclause).
Add a new subclause 180.9.14 for Output jitter. The content is to be taken from 176D.8.9, with additional exceptions:
- transmit equalizer is fixed
- when the PHY includes an xAUI-n, the clock source for the test pattern is derived from the clock recovered from the xAUI-n input signal.

Implement similarly in clauses 181, 182, and 183, as appropriate.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the task force:
https://www.ieee802.org/3/dj/public/25_09/ran_3dj_04_2509.pdf

Based on the results of straw poll TF-2 there is sufficient consensus make the proposed changes.

Implement the suggested remedy with editorial license.

Straw poll TF-1 (directional)
I support adopting the suggested remedy in comment #399.

Yes: 22
No: 6
NMI: 14
Abstain: 19

Straw poll TF-2 (decision)
I support closing comment #399 adopting the suggested remedy in comment #399.
Yes: 22
No: 17
Abstain: 20

---

*Cl* **180** *SC* **180.7.1** *P* **453** *L* **47** # 157

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. If TDECQ/TECQ are kept at 3.4 dB given the new TDECQ equalizer will add 1+ dB of penalty to the receiver.

*SuggestedRemedy*

Propose to split the gain from 1T DFE between TX and RX PMDs:
- Reduce TDECQ from 3.4 dB to 3.0
- Reduce TECQ from 3.4 dB to 3.0
- Reduce |TDECQ-TECQ| from 2.5 dB to 2.2 dB
- Reduce TDECQ range from 3.4 dB to 3.0 under Outer OMA parameter

Based on the resolution also adjust Figure 180-3, SECQ in table 180-8, Figure 180-4, and Figure 180-5,
see ghiasi_3dj_01_2509

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **180** *SC* **180.7.1** *P* **454** *L* **7** # 162

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TX overshoot (O)*

In D2.0 1T DFE was added to the TDECQ equalizer where DFE is suprior to improve TDECQ for bandlimited transmitters over using large overshoot/undershoot which can have 1-2 dB of SNR penalty given TDECQ doesn't incorporate peak-to-average penlaty. Large overshoot/undershoot can also result in clipping which can have much higher penalty than peak-to-average penalty. Another penalty of using overshoot/undershoot is reduction of OMA.

*SuggestedRemedy*

Given that TDECQ equalizer now has 1T DFE reduce overshoot from 22% to 12%
see ghiasi_3dj_01_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_01a_2509.pdf

The comment does not provide sufficient justification to support the suggested remedy. Further data is encouraged to bring to the task force for consideration.

---

*Cl* **180** *SC* **180.7.1** *P* **454** *L* **26** # 124

Landry, Gary — Texas Instruments

*Comment Type* **E** *Comment Status* **R** *(bucket) (O)*

The text was changed from referencing "Table 180-8" to "180-9." This sentence refers to the Tx specs and should have remained "Table 180-8"

*SuggestedRemedy*

Change reference back to Table 180-8

*Response* *Response Status* **C**

REJECT.
The D2.1 clean version correctly has the cross reference as Table 180-8

*Cl* **180** *SC* **180.7.3** *P* **456** *L* **35** # 133

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget can be adjusted down.

*SuggestedRemedy*

In Table 180-9 make following changes
- Power budget (for Max TDECQ) reduced from 6.7 to 6.3 dB
- Allocation for penalties (for Max TDECQ) reduced from 3.7 to 3.3 dB
see ghiasi_3dj_02_2509

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **180** *SC* **180.7.3** *P* **456** *L* **35** # 136

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget is reduced by 0.4 dB.

*SuggestedRemedy*

Given the 0.4 dB power budget reduction in Table 180-9 suggest to split the difference between TX and RX PMDs, and make following adjustments to the OMA:
- Table 180-7 Outer OMA change 4.2 to 4.0 dBm
-Table 180-8 Receiver Power Outer OMA (max) change 4.2 to 4.0 dBm
see ghiasi_3dj_02_2509

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **180** *SC* **180.7.3** *P* **456** *L* **35** # 166

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget can be adjusted down.

*SuggestedRemedy*

In Table 180-9 make following changes
- Power budget (for Max TDECQ) reduced from 6.7 to 6.3 dB
- Allocation for penalties (for Max TDECQ) reduced from 3.7 to 3.3 dB
see ghiasi_3dj_02_2509

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **180** *SC* **180.8.3** *P* **459** *L* **48** # 142

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(bucketp) (O)*

Missing IEC reference for single row 12-fiber and single-row 16 fiber

*SuggestedRemedy*

Add folloiwng IEC references
- IEC 61754-7-1:2014 for single row MPO 12-fiber
- IEC 61754-7-2:2017 for two rows MPO 12-fiber
- IEC 61754-7-3:2019 single rows MPO 16-fiber

*Response* *Response Status* **C**

REJECT.

Annex 180A was created to contain the details about the MDIs which includes references to appropriate TIA and IEC standards for the appropriate MDIs.

IEC 61754-7-1:2014 for single row MPO 12-fiber is specified in 180A
IEC 61754-7-2:2017 for two rows MPO 12-fiber is not referenced in the draft
IEC 61754-7-3:2019 one rows MPO 16-fiber is actually two rows of MPO 16-fiber and no single row of MPO 16-fiber is specified by IEC.

*Cl* **180** *SC* **180.9.4** *P* **461** *L* **33** # 316

Rodes, Roberto — Coherent

*Comment Type* **E** *Comment Status* **A** *(bucket) TDECQ method (O)*

The definitions of OMA, overshoot, transmitter power excursion, extinction ratio, and transition time are misleading. These tests are measured using waveforms at the output of the reference receiver defined in 180.9.5. This wording could give the impression that the same waveform used in 180.9.5 is applied to the test, which is not the case.

*SuggestedRemedy*

Move the definition of the reference receiver from the TDECQ to the TECQ subclause, and specify TDECQ by referencing TECQ with the addition of the fiber, instead of the other way around as it is currently written in the document.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

*Cl* **180** *SC* **180.9.5** *P* **447** *L* **1** # 179

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ (CO)*

The current TDECQ calculated at a pre-FEC target SER is intended to correlate to receiver sensitivity, not link performance

*SuggestedRemedy*

Add a new CER TDECQ metric that esitimates the power penalty at a target CER (codeword error ratio) to have better correlation with link performance. The definition for this CER TDECQ and suggested wording will be provided in a supporting presentation.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_09/chayeb_3dj_01b_2509.pdf

According straw poll TF-3 there is sufficient consensus for the proposal in chayeb_3dj_01b_2509.

Implement the proposal on slides 12 to 19 of chayeb_3dj_01b_2509 in Clause 180, 181, 182, and 183.

Clarify on slide 15 that "center of the target histogram" refers to the horizontal center.

Straw poll TF-3 (directional)
I support adopting the proposal on slides 12 to 19 of
https://www.ieee802.org/3/dj/public/25_09/chayeb_3dj_01b_2509.pdf
Yes: 22
No: 10
NMI: 8
Abstain: 12

*Cl* **180** *SC* **180.9.5** *P* **462** *L* **3** # 351

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **R** *TDECQ method (CO)*

TDECQ appears to have two errors on its estimation of symbol error rate. It tripple counts errors because if computes the probability of crossing each of three thresholds separately and adds those probabilities together, whereas any given symbol can only make one symbol error. It underestimates the probability of error because it ignores the tail of the Gaussian noise beyond the magnitude of the furthest y value from the threshold of interest.

*SuggestedRemedy*

Use a modified TDECQ where the symbol error probability is estimated as the more usual \sum_y{p(y) (prob(n>T_1-y)+prob(n<T_2-y))} for Gaussian noise n, T_1 is the threshold above y, and T_2 is the threshold below y. If y is above the top threshold (or below the bottom threshold) drop the T_1 (or T_2) term. A presentation will explain this.

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/swenson_3dj_01a_2509.pdf

After CGR discussion there was no consensus to make a change at this time. We encourage further work on this subject.

*Cl* **180** *SC* **180.9.5** *P* **462** *L* **8** # 144

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ method (CO)*

TDECQ mission mode test definition should be made more clear

*SuggestedRemedy*

Propsoed text
TDECQ is defined with all receive xAUI-n lanes when instantiated in operation using test pattern 3 or 5 (see Table 180-13). xAUI-n lanes operate with receiver jitter tolerance condition defined by applicable instantiated xAUI-n.
The received test patterns shall be asynchronous to the pattern used to test the transmitter, and shall
have power levels as specified in Table 180-8 for the aggressor lanes in the stressed receiver
sensitivity test.

*Response* *Response Status* **U**

REJECT.

There was not sufficient consensus to adopt the proposed changes.

Straw poll TF-4 (directional)
I support adopting the suggested remedy with or without some caveats for clauses 180 through 183.
Yes: 10
No: 11
NMI: 3
Abstain: 13

*Cl* **180** *SC* **180.9.5** *P* **462** *L* **21** # 226

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

We adopted a 1-tap DFE equalizer for 200G/L optical interface as part of the reference equalizer to process data for TDECQ. The implementation of the 1-tap DFE equalizer and its relation with the FFE equalizer was not explicitly specified. Details should be added for the new reference equalizer, i.e. an updated subclause like 121.8.5.4 TDECQ reference equalizer is needed.

*SuggestedRemedy*

Add a section of 180.9.5.2 TDECQ equalizer , with a figure 180-6 to describe the 15tap FFE and 1tap DFE function model. Information of TDECQ calculation described in 121.8.5.3 also needs updated. It may provide more clarity if a subsection describing the measurement is added to 180. A conribution with detailed changes will be submitted later.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed.
https://www.ieee802.org/3/dj/public/25_09/mi_3dj_02_2509.pdf

A strawpoll was taken O-6 (directional)
I support specifying the sampling point for optimizing of the DFE tap.

A: Yes
B: No
C: Abstain
A: 6 B: 13 C: 8

Add new Figure 180-8 per slide 8 of mi_3dj_02_2509.pdf with the exception of the blue Reference Equalizer label.

Add new Figure 180-x as per slide 11 of mi_3dj_02_2509.pdf considering the tap specifications in Table 180-15 excluding the equations in the upper left corner.

With editorial license.

*Cl* **180** *SC* **180.9.5** *P* **462** *L* **21** # 352

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

A 1 tap DFE has been added to the reference equalizer, but there is no mention of how it is to be set. There is no mention of how (or whether) Ceq is to take into account the the DFE tap with respect to noise enhancement. Ceq is based on H_{eq}, but it is not stated whether H_eq includes the DFE is to include the DFE tap. It is not clear if this is supposed to be a continuous time DFE, and if not, how the histograms are computed.

*SuggestedRemedy*

Remove the 1 tap DFE from the reference equalizer or alternatively provide the necessary details for a complete spec.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comments #226 and #187.

*Cl* **180** *SC* **180.9.5** *P* **462** *L* **22** # 400

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *TDECQ reference EQ (CO)*

The effect of the DFE depends on the time when it is applied, but it is not specified.
One can assume that the DFE is applied 0.5 UI after the sampling point ("middle of the eye", but that point is not well-defined when there is a DFE. Choosing the middle of the eye before the DFE is applied leads to sub-optimal results and does not match the way receivers work. Therefore, the sampling point should be defined explicitly.

Two approaches for selecting the sampling point for application of a DFE have been used in recent projects:
- Annex 120G (802.3ck-2022) defines a point t_s on the pulse response that minimizes the pre-cursor ISI. This method is adequate for a receiver that only includes a DFE, which cannot handle pre-cursor ISI.
- Annex 178A (in this draft): In 178A.1.8, t_s(0) is defined as the time that values the mean-squared error (intermediate result in calculation of COM). This is more adequate for a receiver that includes an FFE, which can also reduce pre-cursor ISI. It is assumed that the FFE and the DFE are jointly optimized at the sampling point using Minimum MSE calculation (which is not specified for TDECQ) with a specified noise model..

Other approaches can be examined, for example, choosing the sampling phase that minimizes TDECQ (which is not necessarily the same as the MMSE solution, and could require longer calculations).

THe "division of work" between the DFE and the FFE should also be specified, becuase for every value of a DFE, a different FFE would be needed. The optimal value depends on the noise model, which is unknown for TDECQ, because the spectral density is not captured by a sampling scope.

Since each approach would yield different result, in order to avoid ambiguity (e.g. difference between scope vendors and offline analysis), a specific one needs to be specified.

Note that the reference receiver does not necessarily represent a real receiver implementation (it has no CTLE, nor quantization/clipping noise) so the choice doesn't need to realistic or optimal. The recommendation in the suggested remedy is based on a reasonable and simple to describe algoritthm.

*SuggestedRemedy*

Choose one method and specify it explicitly.
My recommendation would be:
1. Calculate the pulse response (required for most FFE optimization methods anyway)
2. Set the sampling time to the peak of the pulse response.
3. Choose the DFE coefficient that forces the first postcursor to be zero.
4. Calculate the MMSE FFE for the chosen sampling time and DFE.
5. Apply the FFE and then the DFE as a constatnt correction that in the range [-0.5, +0.5] around the sampling point.

*Response* *Response Status* **W**

REJECT.

An alternate proposal for normalizing the DFE tap is provided by comment #174.

A straw poll was taken in response to comment #226 where the CRG decided not to specify a sample point.

After CRG discussion there was no consensus to make any further changes at this time.

*Cl* **180** *SC* **180.9.5** *P* **462** *L* **24** # 187

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ method (CO)*

TDECQ reference point where OMA is measured and noise is added in not explicitly specified

*SuggestedRemedy*

Specify TDECQ reference point at the input of the FFE equalizer. Add a sentence after the definition of the reference equalizer that explicitly specifies the TDECQ reference point. The TDECQ reference point where OMA is measured and noise is added is at the input of the FFE equalizer.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The current draft indeed explicitly specified the point of adding the noise, in 802.3-2022, 121.8.5.3, "The value of Ceq can be calculated from the product of the normalized noise power density spectrum N(f) at the input of the reference equalizer ..." , which is the same reference point as in the suggested remedy. However, it is embedded in the math of TDECQ, that could be stated more directly. A sentence and a figure may be needed to help undertand the content.

Regarding the reference point for OMA measurement, it is clearly stated in 180.9.4: "OMAouter is measured using waveforms captured at the output of the reference receiver defined in 180.9.5, before the reference equalizer." It is suggested to maintain the current content. .

Add a new statement to the TDECQ exceptions in 180.9.5
"The TDECQ reference point where OMA_TDECQ is referenced to and noise is added is at the input of the FFE equalizer."

Implement with editorial license and discretion to import subclause 121.8.5 and incorporate the exceptions.

*Cl* **180** *SC* **180.9.5** *P* **463** *L* **13** # 313

Rodes, Roberto Coherent

*Comment Type* **T** *Comment Status* **A** *TDECQ reference EQ (CO)*

Current tap values where based on FFE only equalizer. With the addition of a 1-tap DFE the main tap value is expected to be lower. Applies to clauses 181, 182 and 183

*SuggestedRemedy*

Change Main tap coefficient limit minimum value from 0.9 to 0.8. Supporting presentation will be provided

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/rodes_3dj_01a_2509.pdf

In Table 180-15, for Main tap coefficient limit minimum value change from "0.9" to "0.8".
Apply same change to 181, 182, and 183.
With editorial license.

*Cl* **180** *SC* **180.9.5** *P* **463** *L* **13** # 314

Rodes, Roberto Coherent

*Comment Type* **T** *Comment Status* **A** *TDECQ reference EQ (CO)*

Pre-post equalizer difference constrain was based on FFE-only reference equalizer. The difference is expected to be larger now with 1-tap DFE. Applies to clauses 181, 182 and 183

*SuggestedRemedy*

Change Pre-post equalizer coefficient difference limit from 0.25 to 0.55. Supporting presentation will be provided

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #183.

*Cl* **180** *SC* **180.9.5** *P* **463** *L* **25** # 445

Dudek, Mike Marvell

*Comment Type* **T** *Comment Status* **A** *TDECQ reference EQ (CO)*

The limit for the difference in tap weights between the first postcursor and first precursor were analyzed with no DFE. The DFE tap weight can substitute for the FFE first postcursor.

*SuggestedRemedy*

Change the equation for the pre-post equalizer coefficient difference limit to be Absolute Value of (w(1)+DFE tap weigth -w(-1))

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #183.

*Cl* **180** *SC* **180.9.5** *P* **463** *L* **25** # 183

El-Chayeb, Ahmad Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

The conditional pre-post FFE equalizer coefficient difference limit |w(1) - w(-1)| < 0.25, for w(1) > 0 does not provide sufficient specificity for the implementation

*SuggestedRemedy*

Remove the condition W(1)> 0; Adopt a pre-post FFE equalizer coeifficient difference limit of:
|w(1) - w(-1)| < 0.25

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 180-15, for Pre-post equalizer coefficient difference limit: change
"w(1) - w(-1)|, for w(1) > 0"
to
"-0.25 = w(1)/w(0) - b(1) - w(-1)/w(0) = 0.25"

Implement the same change in 181, 182, and 183.

With editorial license

*Cl* **180** *SC* **180.9.5** *P* **463** *L* **25** # 446

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *TDECQ reference EQ (CO)*

The equation says this the pre-post equalizer coefficient difference limit is for w(1)>0. It does not say what the condition is for w(1)<=0

*SuggestedRemedy*

Add clarification with an extra row "for w(1)<=0 with dashes for both minimum and maximum. (or better replace all the dashes with "no limit"). Apply to 181, 182, and 183 as well.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #183.

*Cl* **180** *SC* **180.9.5** *P* **463** *L* **30** # 174

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

The DFE tap limit reference is not explicitly specified. The DFE tap limits need to be refrenced to the signal's amplitude to be able to apply the corrections.

*SuggestedRemedy*

Specify the DFE tap limit reference as OMA/2 measured at the input of the FFE equalizer

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 180-15 for DFE coefficient limit add footnote b stating "The DFE coefficient b(1) is referenced to OMA_outer/2 measured at the input of the FFE equalizer".

Implement the same change in 181, 182, and 183.

With editorial license.

*Cl* **180** *SC* **180.9.7** *P* **464** *L* **23** # 510

Cole, Chris — Coherent Corp.

*Comment Type* **T** *Comment Status* **A** *(LATE) (O)*

Proposal is updated based on new work and data, as promised TF during Aug. meeting

*SuggestedRemedy*

Update per cole_3dj_01_2509 previewed in cole_3dj_01c_adhoc_250828

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentations were reviewed.

https://www.ieee802.org/3/dj/public/25_09/cole_3dj_01_2509.pdf
https://www.ieee802.org/3/dj/public/25_09/dudek_3dj_01_2509.pdf

A straw poll was requested #O5 (directional):
I support making the changes to the Tx FRx tests as proposed in dudek_01_2509.pdf.
A: yes
B: no
C: abstain

A: 11 B: 19 C: 11

Implement slides 4, 6, 8, 9, 10, 12, 13, 15, 16, 18 and 19
of issenhuth_01a_2509.pdf

This comment was received after the Working Group ballot closed.

*Cl* **180** *SC* **180.9.7** *P* **464** *L* **31** # 233

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **E** *Comment Status* **A** *(bucket) (O)*

p=1, where p should be italian

*SuggestedRemedy*

make p italian

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the format of p into italics.

*Cl* **180** *SC* **180.9.7** *P* **464** *L* **31** # 449

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(bucket) (O)*

Confusion between codeword and test block. The test is performed with PRBS31Q so codeword is not appropriate.

*SuggestedRemedy*

Change "single codeword" to "single test block".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **180** *SC* **180.9.7** *P* **464** *L* **37** # 511

Cole, Chris — Coherent Corp.

*Comment Type* **T** *Comment Status* **A** *(LATE) (O)*

Table 180-17 needs updating as per above

*SuggestedRemedy*

Replace Table 180-17 with table in cole_3dj_01_2509 previewed in cole_3dj_01c_adhoc_250828

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

This comment was received after the Working Group ballot closed.

---

*Cl* **180** *SC* **180.9.7** *P* **464** *L* **53** # 315

Rodes, Roberto — Coherent

*Comment Type* **T** *Comment Status* **A** *TX FRX (O)*

In the Transmitter funtional symbol error mask is not necessary to specify extremaly low probabilities. No need to go lower than the Hmax(16) per 174A.8.5 for the PMD-to-PMD BER per ISL allocation based on Table 174A-1

*SuggestedRemedy*

Change the Probability Hmax(k) for k>8 to 3.5e-13

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

---

*Cl* **180** *SC* **180.9.7** *P* **465** *L* **17** # 228

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *TX FRX (O)*

The paragraph about clock source is not part of the definition, it is rather a setup of the measurement. putting it in between the functional receiver definition of equation 180-1 is interrupting the flow of thoughts.

*SuggestedRemedy*

move the paragraph "For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M)..." to 180.9.7.2, after the sentence "The test symbols errors are measured using the method described in 174A.8.3."
OR
move the paragraph to the main section 180.9.7, after the first paragraph where the test patternn is mentioned. "The transmitter functional symbol error histogram is measured using the test pattern defined in Table 180-14." then add "For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M)..."
It is also helpful to clarify this clock setting is meant for the Transmitter under test, e.g.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response #510.

*Cl* **180** *SC* **180.9.7.1** *P* **465** *L* **20** # 227

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *TX FRX (O)*

Some clarification regarding the functional receiver is needed. The current draft says "The functional receiver is an optical receiver, independent of the transmitter under test, that meets the requirements of Table 180-17 with a variable optical attenuator (VOA) placed....', where Table 180-17 is an error mask, and meant for constraining the performance of the transmitter with the receiving function of the the functional receiver. We can't define a functional receiver only based on an error mask either. The functional receiver should at least have receiver sensitivity and stressed receiver sensitivity compliant to 802.3, if not tightened. It should be able to receive the correct wavelength range, and AOP.

The receiver should be compliant with the requirements of IEEE 802.3dj's requirements to a receiver, i.e., Table 180-8.

*SuggestedRemedy*

option a: change to "The functional receiver is an optical receiver, independent of the transmitter under test, that meets the requirements of Table 180-8" .

option b:
However, since the receiver is required to be able to provide error histogram better than the mask defined in 180-17, another option is to maintain the current sentence, while adding a description about compliant to 180-8
"The functional receiver is an optical receiver, independent of the transmitter under test, that meets the requirements of Table 180-17 with a variable optical attenuator (VOA) placed before the input which is set to achieve functional receiver (FRx) OMA as defined in Equation (180-1). The optical receiver shall be compliant with the requirements of Table 180-8. "

*Response* *Response Status* **C**

ACCEPT.

Resolve using the response #510.

*Cl* **180** *SC* **180.9.7.1** *P* **465** *L* **20** # 448

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *TX FRX (O)*

It would be better to directly measure the effect of fiber dispersion related to Block Error Ratio rather than relying on TDECQ measurements.

*SuggestedRemedy*

Expand the test to measure with three conditions, no fiber, a max positive dispersion fiber and a minimum negative dispersion fiber (accounting for the losses of the fibers) and remove the "max(Tx_TDECQ-Tx_TECQ,0) term from equation 180-1. The Tx must pass the Transmitter functional symbol error mask in all three cases. A presentation will be provided.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

*Cl* **180** *SC* **180.9.7.1** *P* **465** *L* **25** # 145

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *TX FRX (O)*

Unless xAUI-n interface operate with condition of jitter tolerance FRx will not catch anything

*SuggestedRemedy*

Add: AUI lanes operate with receiver jitter tolerance condition defined by applicable instantiated xAUI-n.

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

*Cl* **180** *SC* **180.9.7.1** *P* **465** *L* **28** # 512

Cole, Chris — Coherent Corp.

*Comment Type* **T** *Comment Status* **A** *(LATE) (O)*

Equations 180-1 and 180-2 need updating as per above

*SuggestedRemedy*

Replace Table Equations 180-1 and 180-2 with equations in cole_3dj_01_2509 previewed in cole_3dj_01c_adhoc_250828

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

This comment was received after the Working Group ballot closed.

*Cl* **180** *SC* **180.9.7.1** *P* **465** *L* **32** # 450

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *TX FRX (O)*

There is no need to measure the Tx_OMA.

*SuggestedRemedy*

Delete "measured"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

*Cl* **180** *SC* **180.9.12** *P* **467** *L* **3** # 401

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *RINxxOMA (O)*

The equation of RINxxOMA has B, a frequency in Hz units, at the denominator, while the N^2 and OMA_outer^2 terms are assumed to have the same units and cancel out, so the argument of the log10 has a dimension of time (in seconds). This does not make sense - log can only applied to a pure number.

Most of the units are not specified in this equation; OMA_outer is specified in Table 180-7 in dBm, but apparently here it should be in linear power units (it is inside the log10).

*SuggestedRemedy*

Correct the equation as necessary to have an dimensionless argument of the log10.
State the units of each term in the "where" list.
Consider changing OMA_outer to 10^(OMA_outer/10) in the equation, to convert it from dBm to mW.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Add a new where statement to equation 180-3
"OMAouter is the optical modulation amplitude in linear units."

For equation 180-3 change the 4th where statement to

"N0 and N3 are to be measured in linear units on a region in a place in the pattern that is selected to minimize the measurement error"

With editorial license.

*Cl* **180** *SC* **180.9.12** *P* **467** *L* **14** # 402

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *RINxxOMA (O)*

"B = Low-pass bandwidth of filter of the reference receiver (Hz)."

What is this value?
The first paragraph of the subclause mentions "the reference receiver specified for TDECQ measurement in 180.9.5".
Then 180.9.5 says "The reference receiver, composed of the combination of the O/E converter and the oscilloscope, has a 3 dB bandwidth of approximately 53.125 GHz with a fourth-order Bessel-Thomson response to at least 1.3 × 106.25 GHz".

But the text here just says "low-pass bandwidth", not "3 dB bandwidth". In this context, one could interpret it as the noise-equivalent bandwidth (which for a 4th-order BT filter is 1.046 times the -3 dB bandwidth); this would make a difference of 0.2 dB in the result.

It would be a good service to readers to provide a numeric value (instead of causing them to research and ponder about what bandwidth is intended).

*SuggestedRemedy*

Assuming the intent is the -3 dB bandwidth, 53.125 GHz: Change to "B = 53.125 x 10^9".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

During CRG discussion it was concluded that explicitly stating the bandwidth does not belong in this statement because this definition is reused by other clauses.

In equation 180-3, change the last where statement to

"B = Noise bandwidth of the reference receiver (Hz)."

*Cl* **180** *SC* **180.9.13** *P* **467** *L* **29** # 319

Johnson, John — Broadcom

*Comment Type* **E** *Comment Status* **A** *(bucket) (O)*

The Note about the use of linear extrapolation, while syntactically correct, is challenging to parse.

*SuggestedRemedy*

Change From: "NOTE - To reduce test time, a means to provide statistical projection of the measured histograms (see 174A.8.3), if the statistical projection is modeled accurately by a linear fit extrapolation, follows."

To: "NOTE - If the statistical projection is modeled accurately by a linear fit extrapolation, a means to provide statistical projection of the measured histograms (see 174A.8.3) in order to reduce test time follows."

The same remedy can be applied to the Notes in clauses 180.9.14, 181.9.13, 181.9.14, 182.9.13, 182.9.14, 183.9.13 and 183.9.14, with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: changed page/line from 496/35]

*Cl* **180** *SC* **180.9.13** *P* **467** *L* **31** # 61

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **R** *Receiver sensitivity (CO)*

For projection, any value greater than 0 is significant and should not be ignored, esp. for the higher-count bins.

*SuggestedRemedy*

Change "greater than 2" to "greater than 0".
Implement the same in 180.9.14, 181.9.13/14, 182.9.13/14, and 183.9.13/14.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **180** *SC* **180.12.4.7** *P* **475** *L* **24** # 131

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **T** *Comment Status* **A** *Editorial (O)*

While "Each lane" gives a comment for TDECQ and TECQ, the subclause actually gives the requirement ("shall be within the limits given in Table 180-7"). It should be mentioned as the Value

*SuggestedRemedy*

Replace Value/Comment of OM5 and OM6 'Each lane within the limits of Table 180-7"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #57.

*Cl* **180A** *SC* **180A.2** *P* **901** *L* **29** # 419

Ran, Adee Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *MDI breakout (O)*

Table 180A-1 (and this whole Annex) are based on the idea that DR modules can be used in a breakout configuration or with multiple PMDs per connector. But this concept is not mentioned.
The sentence "Table 180A-1 shows the number of PMDs supported by each MDI type" is odd - typically an MDI is the interface of a single PMD to its medium, and the term "MDI type" (which is apparently something else) is only used here and has never been defined.
The reader should be informed that having multiple PMDs that share one connector requires proper configuration of the host to match the PMDs with their respective link partners.

*SuggestedRemedy*

Add a paragraph that describes the concept of an MDI connector (which can include multiple MDIs, depending on the PHY type). This paragraph should not include a requitement from a host to support any possible combination of MDIs.

Change "MDI type" to "MDI connector" (or "MDI receptacle" if it's more suitable) in the text and in the table.

Add cross-references in the first column to 180A.3.1 and 180A.3.2.

Add an informative NOTE about the need to configure the host when multiple PMDs share a connector.

Implement with editorial license.

*Response* *Response Status* **W**

REJECT.

The suggested remedy does not provide sufficient detail to implement. Significant changes have been agreed for the annex and the commentor is encouraged to review the updated draft.

*Cl* **180A** *SC* **180A.3.1** *P* **901** *L* **47** # 420

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **R** *MDI breakout (O)*

As 180A.2 shows, the connector can serve multiple MDIs. Therefore the text that refers to the MDI (meeting specifications, optically mate, .) and the receptacle in Figure 180A-1 are not single MDIs but one or more MDIs.
The term "MDI connector" (or "receptacle") can solve this problem.
Also in 180A.3.2,

*SuggestedRemedy*

Change "MDI" to "MDI connector" (or "MDI receptacle" if it's more suitable) across 180A where appropriate. Implement with editorial license.

*Response* *Response Status* **C**

REJECT.

Resolve using the response to comment #419.

*Cl* **180A** *SC* **180A.4.1** *P* **903** *L* **13** # 220

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **TR** *Comment Status* **A** *MDI breakout (O)*

This paragraph primarily addresses a single application where the connector is fully populated with fibers in the Tx1-4 and Rx1-4 positions. There is another application space where these positions are not fully populated with fibers - and may be populated to support a single PMD such as 200GBASE-DR1, 400GBASE-DR2, or 800GBASE-DR4. This section needs to address both application spaces.

*SuggestedRemedy*

A proposal will be provided in a presentation, based on an update to https://www.ieee802.org/3/dj/public/adhoc/178b/25_0827/dambrosia_178b_01b_250827.pdf will be submitted..

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed.
https://www.ieee802.org/3/dj/public/25_09/dambrosia_3dj_02_2509.pdf

Implement slides 4 and 5 of dambrosia_01_2509.pdf with editorial license.

*Cl* **180A** *SC* **180A.4.1** *P* **903** *L* **13** # 222

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **TR** *Comment Status* **A** *MDI breakout (O)*

This text indicates that the Optical lane assignments for the connector can support different combinations of PMDs, but it does not make a normative reference to the assignment of grouping(s) of signals assigned to a given PMD

*SuggestedRemedy*

A proposal will be provided in a presentation, based on an update to https://www.ieee802.org/3/dj/public/adhoc/178b/25_0827/dambrosia_178b_01b_250827.pdf will be submitted..

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #220.

*Cl* **180A** *SC* **180A.4.1** *P* **903** *L* **14** # 421

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *MDI breakout (bucketp) (O)*

"Such interfaces support a single 4-lane optical PMD <..>, or alternatively four single lane optical PMDs <.>, or <.>"
The word "support" is overloaded; it might be interpreted as if all implementations (e.g. optical modules) are required to "support" all these combinations - and it's not necessarily the case.

Also in the last paragraph (lines 42-44 on this page), which is phrased differently, for no apparent reason.

*SuggestedRemedy*

Change "support" to "enable using a connector as".
Change the wording of the last paragraph to match and use the wording above.
Implement with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #220.

*Cl* **180A** *SC* **180A.4.1** *P* **903** *L* **16** # 422

Ran, Adee
Cisco Systems

*Comment Type* **T** *Comment Status* **A** *MDI breakout (O)*

"When an MDI connector is not fully utilized the lower PMD numbers in Table 180A-2 should be used"
This sentence is arguable and ambiguous. It is not clear whether the recommendation addresses the PMD or the fiber connection or both (and what "fully utilized" means depends on that).
Since any non-straightforward cabling requires configuration of the hosts (as noted in another comment), this recommendation is moot.

*SuggestedRemedy*

Delete the quoted sentence.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #220.

*Cl* **180A** *SC* **180A.4.1** *P* **903** *L* **16** # 431

Nicholl, Gary
Cisco Systems

*Comment Type* **T** *Comment Status* **A** *MDI breakout (O)*

The sentence "When an MDI connector is not fully utilized the lower PMD numbers in Table 180A-2 should be used" may place unneccessary restrictions on partially utlizied breakout applications.

It makes sense to have a such a restriction for a single PMD implementation, i.e. to use the lower fiber positions in Table 180A-2. This is becuase for a single PMD implementation you might use a single mutlilane ribbon cable to interconnect two such PMDs, and therefore the fiber positions being used must be explicitly defined.

However this is not the case for breakout implementions where the configuration of PMDs mapped to an MPO conenctor must be broken out at a patch panel. The configuration of this breakout patch panel must match the configuration of PMDs mapped to the MPO. There are a potentially large number of possible configurations (especially with mixed rate breakout). Breakout is by definition an engineered solution and not plug'n'play. The user must be aware of the specific configuration of PMDs mapped to a given MPO. The sentence referenced in the comment therefore places unnecessary restrictions on implementations, without adding any value.

Similar comment against the equivalent sentence on page 904, line 46.

*SuggestedRemedy*

Change from:

"When an MDI connector is not fully utilized the lower PMD numbers in Table 180A-2 should be used."
to:
"For single one, two, or four lane optical PMDs, the lower connector positions in Table 180A-2 shall be used"

Make a similar change to the sentence on page 904, line 46.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #220.

*Cl* **180A** *SC* **180A.4.2** *P* **904** *L* **23** # 221

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **TR** *Comment Status* **A** *MDI breakout (O)*

This paragraph primarily addresses a single application where the connector is fully populated with fibers in the Tx1-8 and Rx1-8 positions. There is another application space where these positions are not fully populated with fibers - and may be populated to support a single PMD such as 200GBASE-DR1, 400GBASE-DR2, 800GBASE-DR4, or 1.6TBASE-DR8. This section needs to address both application spaces.

*SuggestedRemedy*

A proposal will be provided in a presentation, based on an update to https://www.ieee802.org/3/dj/public/adhoc/178b/25_0827/dambrosia_178b_01b_250827.pdf will be submitted..

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #220.

*Cl* **180A** *SC* **180A.4.2** *P* **904** *L* **23** # 223

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **TR** *Comment Status* **A** *MDI breakout (O)*

This text indicates that the Optical lane assignments for the connector can support different combinations of PMDs, but it does not make a normative reference to the assignment of grouping(s) of signals assigned to a given PMD

*SuggestedRemedy*

A proposal will be provided in a presentation, based on an update to https://www.ieee802.org/3/dj/public/adhoc/178b/25_0827/dambrosia_178b_01b_250827.pdf will be submitted..

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #220.

*Cl* **180A** *SC* **180A.4.2** *P* **905** *L* **34** # 218

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **ER** *Comment Status* **A** *(bucket) (O)*

There are two instances of 1.6TBASE-DR8 in the note.

*SuggestedRemedy*

The second instance of 1.6TBASE-DR8 should be replaced with "1.6TBASE-DR8-2.

*Response* *Response Status* **W**

ACCEPT.

*Cl* **181** *SC* **181.7.1** *P* **484** *L* **21** # 125

Landry, Gary — Texas Instruments

*Comment Type* **E** *Comment Status* **R** *(bucket) (O)*

The variable OMAouter (min) is now shown as "max(TECQ, TDECQ)." While strictly correct, it would be better to explictly show the offset for parallelism to other clauses

*SuggestedRemedy*

Change "max(TECQ, TDECQ)" to
"0 + max(TECQ, TDECQ)"

*Response* *Response Status* **C**

REJECT.
While the intention of the comment is understandable, it is unnecessary to add 0 when the value has an explicit expression, i.e., max(TECQ, TDECQ).

*Cl* **181** *SC* **181.7.1** *P* **484** *L* **24** # 158

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. If TDECQ/TECQ are kept at 3.4 dB given the new TDECQ equalizer will add 1+ dB of penalty to the receiver.

*SuggestedRemedy*

Propose to split the gain from 1T DFE between TX and RX PMDs:
- Reduce TDECQ from 3.4 dB to 3.0
- Reduce TECQ from 3.4 dB to 3.0
- Reduce |TDECQ-TECQ| from 2.5 dB to 2.2 dB
- Reduce TDECQ range from 3.4 dB to 3.0 under Outer OMA parameter

Based on the resolution also adjust Figure 180-3, SECQ in table 180-8, Figure 180-4, and Figure 180-5,
see ghiasi_3dj_01_2509

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **181** *SC* **181.7.1** *P* **484** *L* **30** # 163

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TX overshoot (O)*

In D2.0 1T DFE was added to the TDECQ equalizer where DFE is suprior to improve TDECQ for bandlimited transmitters over using large overshoot/undershoot which can have 1-2 dB of SNR penalty given TDECQ doesn't incorporate peak-to-average penlaty. Large overshoot/undershoot can also result in clipping which can have much higher penalty than peak-to-average penalty. Another penalty of using overshoot/undershoot is reduction of OMA.

*SuggestedRemedy*

Given that TDECQ equalizer now has 1T DFE reduce overshoot from 22% to 12%
see ghiasi_3dj_01_2509

*Response* *Response Status* **U**

REJECT.

Resolve using the response to comment #162.

*Cl* **181** *SC* **181.7.2** *P* **486** *L* **4** # 234

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **ER** *Comment Status* **A** *editorial (O)*

the Table for receiver characteristic used to have a footnote for the receiver sensitivity and stressed receiver sensitivity, "Measured with conformance test signal at TP3 (see 18x.8) for the block error ratio specified in 18x.2" . Now CL 180 and CL183 maintains the footnonte, while CL181 and CL 182 removed the foot note.

*SuggestedRemedy*

Make the four IMDD clauses consistent.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
In Tables 181-6 and 182-8 for receiver sensitivity and stressed receiver sensitivity add footnote c "Measured with conformance test signal at TP3 (see 181.8) for the block error ratio specified in 181.2".
Implement the suggested remedy with editorial license.

*Cl* **181** *SC* **181.7.3** *P* **487** *L* **35** # 167

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget can be adjusted down.

*SuggestedRemedy*

In Table 181-9 make following changes
- Power budget (for Max TDECQ) reduced from 7.5 to 7.1 dB
- Allocation for penalties (for Max TDECQ) reduced from 4.0 to 3.6 dB
see ghiasi_3dj_02_2509

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **181** *SC* **181.7.3** *P* **487** *L* **35** # 137

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget is reduced by 0.4 dB.

*SuggestedRemedy*

Given the 0.4 dB power budget reduction in Table 181-7 suggest to split the difference between TX and RX PMDs, and make following adjustments to the OMA:
-Table 181-5 Outer OMA change 4.8 to 4.6 dBm
- Table 181-6 Receiver Power Outer OMA (max) change 4.8 to 4.6 dBm
see ghiasi_3dj_02_2509

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **181** *SC* **181.9.5** *P* **492** *L* **37** # 180

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ (CO) (bucket2)*

The current TDECQ calculated at a pre-FEC target SER is intended to correlate to receiver sensitivity, not link performance

*SuggestedRemedy*

Add a new CER TDECQ metric that esitimates the power penalty at a target CER (codeword error ratio) to have better correlation with link performance. The definition for this CER TDECQ and suggested wording will be provided in a supporting presentation.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #179.

*Cl* **181** *SC* **181.9.5** *P* **493** *L* **12** # 171

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ method (CO)*

TDECQ reference point where OMA is measured and noise is added in not explicitly specified

*SuggestedRemedy*

Specify TDECQ reference point at the input of the FFE equalizer. Add a sentence after the definition of the reference equalizer that explicitly specifies the TDECQ reference point. The TDECQ reference point where OMA is measured and noise is added is at the input of the FFE equalizer.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #187.

*Cl* **181** *SC* **181.9.5** *P* **493** *L* **44** # 184

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

The conditional pre-post FFE equalizer coefficient difference limit |w(1) - w(-1)| < 0.25, for w(1) > 0 does not provide sufficient specificity for the implementation

*SuggestedRemedy*

Remove the condition W(1)> 0; Adopt a pre-post FFE equalizer coeifficient difference limit of:
|w(1) - w(-1)| < 0.25

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #183.

*Cl* **181** *SC* **181.9.5** *P* **493** *L* **49** # 175

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

The DFE tap limit reference is not explicitly specified. The DFE tap limits need to be refrenced to the signal's amplitude to be able to apply the corrections.

*SuggestedRemedy*

Specify the DFE tap limit reference as OMA/2 measured at the input of the FFE equalizer

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #174.

*Cl* **181** *SC* **181.9.7** *P* **495** *L* **1** # 514

Cole, Chris — Coherent Corp.

*Comment Type* **T** *Comment Status* **A** *(LATE) (O)*

Over-fiber test is added to verify functionality with impairments, mainly CD

*SuggestedRemedy*

Update per cole_3dj_01_2509 previewed in cole_3dj_01c_adhoc_250828

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

This comment was received after the Working Group ballot closed.

*Cl* **181** *SC* **181.9.7** *P* **495** *L* **8** # 513

Cole, Chris — Coherent Corp.

*Comment Type* **T** *Comment Status* **A** *(LATE) (O)*

Proposal is updated based on new work and data, as promised TF during Aug. meeting

*SuggestedRemedy*

No changes required except possibly to equation 180-2 reference, as per changes above

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

This comment was received after the Working Group ballot closed.

*Cl* **182** *SC* **182.1** *P* **505** *L* **39** # 434

Nicholl, Gary — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(bucket) AUI (O)*

In Table 182-1, footnote c also applies to 200GAUI-2 C2C and 200GAUI-2 C2M. When implemented in a 200GBASE-DR1-2 PHY the signalling rate of these AUIs must also be constrained as defined in 120.1.4 (i.e. to 50ppm).

Same comment for Table 182-2.

*SuggestedRemedy*

Update Table 182-1 and Table 182-2 , to add footnote c to 200GAUI-2 C2C and 200GAUI-2 C2M (Table 182-1) and 400GAUI-4 C2C and 400GAUI-4 C2M (Tabe 182-2).

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #433.

*Cl* **182** *SC* **182.7.1** *P* **516** *L* **18** # 159

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. If TDECQ/TECQ are kept at 3.4 dB given the new TDECQ equalizer will add 1+ dB of penalty to the receiver.

*SuggestedRemedy*

Propose to split the gain from 1T DFE between TX and RX PMDs:
- Reduce TDECQ from 3.4 dB to 3.0
- Reduce TECQ from 3.4 dB to 3.0
- Reduce |TDECQ-TECQ| from 2.5 dB to 2.2 dB
- Reduce TDECQ range from 3.4 dB to 3.0 under Outer OMA parameter

Based on the resolution also adjust Figure 180-3, SECQ in table 180-8, Figure 180-4, and Figure 180-5,
see ghiasi_3dj_01_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

*Cl* **182** *SC* **182.7.1** *P* **516** *L* **24** # 164

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TX overshoot (O)*

In D2.0 1T DFE was added to the TDECQ equalizer where DFE is suprior to improve TDECQ for bandlimited transmitters over using large overshoot/undershoot which can have 1-2 dB of SNR penalty given TDECQ doesn't incorporate peak-to-average penlaty. Large overshoot/undershoot can also result in clipping which can have much higher penalty than peak-to-average penalty. Another penalty of using overshoot/undershoot is reduction of OMA.

*SuggestedRemedy*

Given that TDECQ equalizer now has 1T DFE reduce overshoot from 22% to 12%
see ghiasi_3dj_01_2509

*Response* *Response Status* **U**

REJECT.

Resolve using the response to comment #162.

*Cl* **182** *SC* **182.7.3** *P* **518** *L* **44** # 132

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget can be adjusted down.

*SuggestedRemedy*

In Table 182-9 make following changes
- Power budget (for Max TDECQ) reduced from 7.7 to 7.3 dB
- Allocation for penalties (for Max TDECQ) reduced from 3.7 to 3.3 dB
see ghiasi_3dj_02_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

*Cl* **182** *SC* **182.7.3** *P* **518** *L* **44** # 138

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget is reduced by 0.4 dB.

*SuggestedRemedy*

Given the 0.4 dB power budget reduction in 182-9 suggest to split the difference between TX and RX PMDs, and make following adjustments to the OMA:
- Table 182-7 Outer OMA change 4.2 to 4.0 dBm
-Table 182-8 Receiver Power Outer OMA (max) change 4.2 to 4.0 dBm
see ghiasi_3dj_02_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

*Cl* **182** *SC* **182.8.3** *P* **521** *L* **51** # 143

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(bucketp) (O)*

Missing IEC reference for single row 12-fiber, two row 12-fiber, and single-row 16 fiber

*SuggestedRemedy*

Add folloiwng IEC references
- IEC 61754-7-1:2014 for single row MPO 12-fiber
- IEC 61754-7-2:2017 for two rows MPO 12-fiber
- IEC 61754-7-3:2019 single rows MPO 16-fiber

*Response* *Response Status* **C**

REJECT.

Resolve using the response to comment #142.
[Editor's note: changed clause/subclause from 180/180.8.3]

*Cl* **182** *SC* **182.9.5** *P* **524** *L* **20** # 181

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ (CO) (bucket2)*

The current TDECQ calculated at a pre-FEC target SER is intended to correlate to receiver sensitivity, not link performance

*SuggestedRemedy*

Add a new CER TDECQ metric that esitimates the power penalty at a target CER (codeword error ratio) to have better correlation with link performance. The definition for this CER TDECQ and suggested wording will be provided in a supporting presentation.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #179.

*Cl* **182** *SC* **182.9.5** *P* **524** *L* **43** # 172

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ method (CO)*

TDECQ reference point where OMA is measured and noise is added in not explicitly specified

*SuggestedRemedy*

Specify TDECQ reference point at the input of the FFE equalizer. Add a sentence after the definition of the reference equalizer that explicitly specifies the TDECQ reference point. The TDECQ reference point where OMA is measured and noise is added is at the input of the FFE equalizer.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #187.

---

*Cl* **182** *SC* **182.9.5** *P* **525** *L* **26** # 185

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

The conditional pre-post FFE equalizer coefficient difference limit |w(1) - w(-1)| < 0.25, for w(1) > 0 does not provide sufficient specificity for the implementation

*SuggestedRemedy*

Remove the condition W(1)> 0; Adopt a pre-post FFE equalizer coeifficient difference limit of:
|w(1) - w(-1)| < 0.25

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #183.

---

*Cl* **182** *SC* **182.9.5** *P* **525** *L* **31** # 176

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

The DFE tap limit reference is not explicitly specified. The DFE tap limits need to be refrenced to the signal's amplitude to be able to apply the corrections.

*SuggestedRemedy*

Specify the DFE tap limit reference as OMA/2 measured at the input of the FFE equalizer

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #174.

---

*Cl* **182** *SC* **182.9.7** *P* **526** *L* **26** # 515

Cole, Chris — Coherent Corp.

*Comment Type* **T** *Comment Status* **A** *(LATE) (O)*

Proposal is updated based on new work and data, as promised TF during Aug. meeting

*SuggestedRemedy*

No changes required except possibly to equation 180-2 reference, as per changes above

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

This comment was received after the Working Group ballot closed.

---

*Cl* **183** *SC* **183.7.1** *P* **545** *L* **42** # 165

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TX overshoot (O)*

In D2.0 1T DFE was added to the TDECQ equalizer where DFE is suprior to improve TDECQ for bandlimited transmitters over using large overshoot/undershoot which can have 1-2 dB of SNR penalty given TDECQ doesn't incorporate peak-to-average penlaty. Large overshoot/undershoot can also result in clipping which can have much higher penalty than peak-to-average penalty. Another penalty of using overshoot/undershoot is reduction of OMA.

*SuggestedRemedy*

Given that TDECQ equalizer now has 1T DFE reduce overshoot from 22% to 12%
see ghiasi_3dj_01_2509

*Response* *Response Status* **U**

REJECT.

Resolve using the response to comment #162.

*Cl* **183** *SC* **183.7.1** *P* **545** *L* **47** # 161

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. If TDECQ/TECQ are kept at 3.4 dB given the new TDECQ equalizer will add 1+ dB of penalty to the receiver.

*SuggestedRemedy*

Propose to split the gain from 1T DFE between TX and RX 800GBASE-LR44 PMDs as following:
- Reduce TDECQ from 3.9 dB to 3.5
- Reduce TECQ from 3.2 dB to 3.0
- Reduce |TDECQ-TECQ| from 2.5 dB to 2.2 dB
- Reduce TDECQ range from 3.4 dB to 3.0 and 3.9 dB to 3.5 dB under Outer OMA parameter

Based on the resolution also adjust Figure 180-3, SECQ in table 180-8, Figure 180-4, and Figure 180-5,
see ghiasi_3dj_01_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

*Cl* **183** *SC* **183.7.1** *P* **545** *L* **47** # 160

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. If TDECQ/TECQ are kept at 3.4 dB given the new TDECQ equalizer will add 1+ dB of penalty to the receiver.

*SuggestedRemedy*

Propose to split the gain from 1T DFE between TX and RX 800GBASE-FR4 PMDs as following:
- Reduce TDECQ from 3.4 dB to 3.0
- Reduce TECQ from 3.4 dB to 3.0
- Reduce |TDECQ-TECQ| from 2.5 dB to 2.2 dB
- Reduce TDECQ range from 3.4 dB to 3.0 under Outer OMA parameter

Based on the resolution also adjust Figure 180-3, SECQ in table 180-8, Figure 180-4, and Figure 180-5,
see ghiasi_3dj_01_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

*Cl* **183** *SC* **183.7.3** *P* **547** *L* **27** # 139

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget is reduced by 0.4 dB.

*SuggestedRemedy*

Given the 0.4 dB power budget reduction in 183-8 suggest to split the difference between TX and RX PMDs, and make following adjustments to the OMA:
- Table 183-6 Outer OMA change equation 1 from -0.1+max(TECQ,TDECQ) to -0.3+max(TECQ,TDECQ)
-Table 183-7 Receiver Power Outer OMA (max) change 4.8 to 4.6 dBm
-Table 183-7 Receive sensitivity OMA change -4.6+TECQ
see ghiasi_3dj_02_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

[Editor's note: changed clause/subclause/page/line from 182/182.7.3/518/44]

*Cl* **183** *SC* **183.7.3** *P* **548** *L* **35** # 134

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget can be adjusted down.

*SuggestedRemedy*

In Table 183-8 make following changes for 800GBASE-FR4
- Power budget (for Max TDECQ) reduced from 7.9 to 7.5 dB
- Allocation for penalties (for Max TDECQ) reduced from 3.9 to 3.5 dB
see ghiasi_3dj_02_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

[Editor's note: changed clause/subclause from 180/180.7.3]

*Cl* **183** *SC* **183.7.3** *P* **548** *L* **35** # 135

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget is reduced by 0.4 dB.

*SuggestedRemedy*

In Table 183-8 make following changes for 800GBASE-LR4
- Power budget (for Max TDECQ) reduced from 11.3 to 10.9 dB
- Allocation for penalties (for Max TDECQ) reduced from 5 to 4.6 dB
see ghiasi_3dj_02_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

[Editor's note: changed clause/subclause from 180/180.7.3]

*Cl* **183** *SC* **183.7.3** *P* **548** *L* **36** # 141

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget is reduced by 0.4 dB.

*SuggestedRemedy*

Given the 0.4 dB power budget reduction in 183-8 suggest to split the difference between TX and RX PMDs, and make following adjustments to the OMA:
- Table 183-6 Outer OMA change equation 1 change from 5.7 to 5.5 dBm
-Table 183-7-8 Receive Outter OMA change 5.7 dBm to 5.5 dBm
see ghiasi_3dj_02_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

*Cl* **183** *SC* **183.7.3** *P* **548** *L* **36** # 140

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *TDECQ limits (O)*

In D2.0 1T DFE was added to the TDECQ equalizer which reduces TDECQ by 0.5-1.0 dB. Given the TDECQ reduction, assuming 3.0 dB is the value WG accepts then power budget is reduced by 0.4 dB.

*SuggestedRemedy*

Given the 0.4 dB power budget reduction in 183-8 suggest to split the difference between TX and RX PMDs, and make following adjustments to the OMA:
- Table 183-6 Outer OMA change from 4.8 to 4.6 dBm
-Table 183-7 Receiver Power Outer OMA (max) change 4.8 to 4.6 dBm
see ghiasi_3dj_02_2509

*Response* *Response Status* **U**

REJECT.

The following presentation was reviewed
https://www.ieee802.org/3/dj/public/25_09/ghiasi_3dj_02a_2509.pdf

The CRG did not change the TDECQ limit so this suggested change is not necessary.

*Cl* **183** *SC* **183.7.3** *P* **548** *L* **47** # 318

Johnson, John — Broadcom

*Comment Type* **T** *Comment Status* **R** *(bucketp) (O)*

Footnote (b) of Table 183-8 has an error. Per Table 183-11, the maximum channel insertion loss for 800GBASE-FR4 can be reduced by up to 0.3dB.

*SuggestedRemedy*

Change Table 183-8 footnote (b)
From: "This channel insertion loss may be reduced by up to 0.5 dB ."

To: "This channel insertion loss may be reduced by up to 0.3 dB ."

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **183** *SC* **183.9.5** *P* **555** *L* **20** # 182

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ (CO) (bucket2)*

The current TDECQ calculated at a pre-FEC target SER is intended to correlate to receiver sensitivity, not link performance

*SuggestedRemedy*

Add a new CER TDECQ metric that esitimates the power penalty at a target CER (codeword error ratio) to have better correlation with link performance. The definition for this CER TDECQ and suggested wording will be provided in a supporting presentation.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #179.

*Cl* **183** *SC* **183.9.5** *P* **555** *L* **43** # 173

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ method (CO)*

TDECQ reference point where OMA is measured and noise is added in not explicitly specified

*SuggestedRemedy*

Specify TDECQ reference point at the input of the FFE equalizer. Add a sentence after the definition of the reference equalizer that explicitly specifies the TDECQ reference point.
The TDECQ reference point where OMA is measured and noise is added is at the input of the FFE equalizer.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #187.

---

*Cl* **183** *SC* **183.9.5** *P* **556** *L* **31** # 186

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

The conditional pre-post FFE equalizer coefficient difference limit |w(1) - w(-1)| < 0.25, for w(1) > 0 does not provide sufficient specificity for the implementation

*SuggestedRemedy*

Remove the condition W(1)> 0; Adopt a pre-post FFE equalizer coeifficient difference limit of:
|w(1) - w(-1)| < 0.25

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #183.

---

*Cl* **183** *SC* **183.9.5** *P* **556** *L* **36** # 177

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *TDECQ reference EQ (CO)*

The DFE tap limit reference is not explicitly specified. The DFE tap limits need to be refrenced to the signal's amplitude to be able to apply the corrections.

*SuggestedRemedy*

Specify the DFE tap limit reference as OMA/2 measured at the input of the FFE equalizer

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #174.

---

*Cl* **183** *SC* **183.9.7** *P* **557** *L* **47** # 517

Cole, Chris — Coherent Corp.

*Comment Type* **T** *Comment Status* **A** *(LATE) (O)*

Over-fiber test is added to verify functionality with impairments, mainly CD

*SuggestedRemedy*

Update per cole_3dj_01_2509 previewed in cole_3dj_01c_adhoc_250828

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

This comment was received after the Working Group ballot closed.

---

*Cl* **183** *SC* **183.9.7** *P* **558** *L* **1** # 516

Cole, Chris — Coherent Corp.

*Comment Type* **T** *Comment Status* **A** *(LATE) (O)*

Proposal is updated based on new work and data, as promised TF during Aug. meeting

*SuggestedRemedy*

No changes required except possibly to equation 180-2 reference, as per changes above

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #510.

This comment was received after the Working Group ballot closed.

---

*Cl* **184** *SC* **184.1.1** *P* **568** *L* **11** # 505

Opsasnick, Eugene — Broadcom

*Comment Type* **ER** *Comment Status* **A** *(bucket) (L)*

Redundant language should be simplified.

*SuggestedRemedy*

Change:
"When necessary for disambiguation, to differentiate the Inner FEC defined in this clause from the 800GBASE-R Inner FEC defined in Clause 177, the term 800GBASE-LR1 Inner FEC is used."
To:
"When necessary to differentiate the Inner FEC defined in this clause from the 800GBASE-R Inner FEC defined in Clause 177, the term 800GBASE-LR1 Inner FEC is used."

*Response* *Response Status* **W**

ACCEPT.

*Cl* **184** *SC* **184.1.2** *P* **568** *L* **31** # 403

Ran, Adee Cisco Systems

*Comment Type* **T** *Comment Status* **R** *(bucket) (L)*

Figure 184-1 shows the Inner FEC sublayer directly below the PCS. However, Figure 184-2 indicates that the sublayer above can also be a PMA (two specific types).
While theoretically the PCS can be connected directly, as in Figure 184-1, it is likely not the implementation most people have in mind.

*SuggestedRemedy*

In Figure 184-1 add a box for the PMA, with a footnote that it is optional and limited to the 800GBASE-R 8:32 PMA or 800GBASE-R 4:32 PMA (to match Figure 184-2).

*Response* *Response Status* **C**

REJECT.
The only time a PMA is above the Inner FEC is when an AUI C2M is present. That will probably be the case for most implementations of 800GBASE-LR1. But it's the same case for all implementations of IMDD PHYs, and we have historically not included AUIs in these introductory figures. This figure is consistent with similar PHY types defined in the base standard.

*Cl* **184** *SC* **184.1.3** *P* **569** *L* **11** # 404

Ran, Adee Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

Following up on comments #418 and #419 againt D2.0.

The inner FEC sublayer should have a way to relay the "RTS" status from the PMA above it to the link partner and vice versa. This could be achieved by enabling/disabling the coherent transmitter output, but alternative methods that keep the transmitter active may be preferable.

*SuggestedRemedy*

A presentation with a detailed proposal will be provided.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **184** *SC* **184.2** *P* **570** *L* **6** # 405

Ran, Adee Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

The service interface in Figure 184-2 does not include an IS_SIGNAL.request primitive, although the PCS and PMA can generate this primitive to the service interface below them. This primitive is required if ILT is to be included; until then, it can be included with a statement that it has no effect.

*SuggestedRemedy*

Add a FEC:IS_SIGNAL.request primitive in Figure 184-2 and add text as necessary in 184.2 and 184.3 (examples can be taken from clause 177).
Implement with editorial license.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **184** *SC* **184.4.2** *P* **572** *L* **14** # 407

Ran, Adee Cisco Systems

*Comment Type* **E** *Comment Status* **A** *Pseudocode (L)*

The labels "pcsla" and "permo" are used as words in the text. They are defined as vectors, but then "pcsla flow" and "permo flow" are used without definition.

Note that PCSL in uppercase is used in other contexts.

*SuggestedRemedy*

Define what these "flows" are (streams of 10-bit symbols?).
Consider changing to PCSL_ALIGNED and PERM_OUT or some other labels in uppercase to make it clearer that these are not plain words.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Names in the pseudocodes are defined in detail. Renaming could make them more descriptive, but they nevertheless are clearly defined and used in specific sections only. pcsla flow is defined in the second paragraph of 184.4.2. But it is not a vector since it increases constantly, it is a flow.

Change: "The vector pcsla[q, i] represents the Inner FEC flows"
To: "pcsla[q, i] represents the Inner FEC flows".

Implement with editorial license.

*Cl* **184** *SC* **184.4.7** *P* **575** *L* **45** # 239

He, Xiang Huawei

*Comment Type* **ER** *Comment Status* **A** *(bucket) (L)*

The terminology "DP-QAM16" is not used in the standard. Instead, "DP-16QAM" is used.

*SuggestedRemedy*

Change "DP-QAM16" to "DP-16QAM"

*Response* *Response Status* **W**

ACCEPT.

*Cl* **184** *SC* **184.7.2.2** *P* **584** *L* **33** # 91

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of dsp_lock<x>
From:
"A Boolean variable that is set to true when the receiver has detected the location of the PS for a given polarization symbol stream on the 800GBASE-LR1 PMD service interface, where x = 0:1."
To:
"A Boolean variable that indicates the receiver has detected the location of the PS for a given polarization symbol stream on the 800GBASE-LR1 PMD service interface, where x = 0 or 1. Its value is set by the DSP lock state diagram (see Figure 184-9)."
Implement with editorial license.

*Cl* **184** *SC* **184.7.2.2** *P* **584** *L* **42** # 92

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Update the definition of reset to keep it consistent with comments #74 - reset is a special case.
Modify the defintion of the reset variable by adding: ", and is false otherwise." to end of the last sentence.
Implement with editorial license.

*Cl* **184** *SC* **184.7.2.2** *P* **584** *L* **47** # 93

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable restart_lock
From:
"A Boolean variable that is set by the DSP frame lock process to reset the synchronization process on each polarization symbol stream. It is set to true when M PS symbols in a row fail to match (M_BAD state) on a given polarization symbol stream."
To:
"A Boolean variable that is used to restart the synchronization process for both polarization symbol streams when M PS symbols in a row fail to match within either polarization symbol stream. Its value is set by the DSP lock state diagram (see Figure 184-9).
Implement with editorial license.

*Cl* **184** *SC* **184.7.2.2** *P* **584** *L* **54** # 94

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to true or false. There is just a description of the use.

*SuggestedRemedy*

Change: Boolean variable that indicates that sym_counter has reached its terminal count.
To: Boolean variable that is set to true when sym_counter has reached its terminal count. Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable sym_counter_done
From:
"A Boolean variable that indicates that sym_counter has reached its terminal count."
To:
"A Boolean variable that is set to true when the counter sym_counter has reached its terminal count. It is set to false when the counter is started (see figure 184-9).
Implement with editorial license.

*Cl* **184** *SC* **184.7.2.2** *P* **585** *L* **3** # 95

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable sym_slip_done
From:
"A Boolean variable that is set to true when the SYM_SLIP requested by the DSP frame lock state diagram has been completed indicating that the next candidate PS position is available for testing."
To:
"A Boolean variable that indicates the next candidate PS position is available for testing. Is it set to true when the SYM_SLIP function completes and is set to false upon entering the GET_SYMBOL state of the DSP lock state diagram (see Figure 184-9)."

Implement with editorial license.

*Cl* **184** *SC* **184.7.2.2** *P* **585** *L* **7** # 96

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of sym_valid
From:
"A Boolean variable that is set to true if the received symbol is a valid PS symbol according to the state of the pilot sequences generator (see 184.4.9) for the value of the current_ps_id variable."
To:
"A Boolean variable that is set to true if the received symbol is a valid PS symbol according to the state of the pilot sequences generator (see 184.4.9) for the value of the current_ps_id variable. Otherwise, this variable is set to false."

Implement with editorial license.

*Cl* **185** *SC* **185.6** *P* **602** *L* **51** # 229

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **T** *Comment Status* **A** *Tx parameter (O)*

the laser frequency slew rate: pre/post acquisition is put into the transmitter spec to faciliate interop. However, the definition of acquisition is not clear. The definition and measurement method of the laser frequency slew rate is not specified in 185.8. In fact, whether it is necessary to measure the laser frequency slew rate is not clear.

*SuggestedRemedy*

Clearly point out whether the parameter needs to be measured or is it a normative requirement. for the TF's discussion.

in 180.7 add a subsection about laser frequency slew rate, with the definition of acquisition. Proposed text for acquisition:
acquisition of the DSP frame is achieved at the LOCK_DONE state of the DSP lock state diagram of Figure 184-9. In other words dsp_lock<x> is true for both polarizations or all_locked is true.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 185-5, for pre and post acquisition add a footnote "Acquisition is when the DSP frame is achieved at the LOCK_DONE state of the DSP lock state diagram in Figure 184-9 for both polarizations."

Implement with editorial license.

*Cl* **185** *SC* **185.8.6** *P* **608** *L* **4** # 438

Kota, Kishore — Marvell Semiconductor

*Comment Type* **T** *Comment Status* **A** *Reference equalizer (O)*

Specify values for the parameters required in the digital signal processing for ETCC.

*SuggestedRemedy*

Add a table specifying values for the number of taps to be used for "Reference Equalizer" and "Reference Post-Equalizer" blocks. Presentation to be provided with specific values.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentations were reviewed

https://www.ieee802.org/3/dj/public/25_09/temprana_3dj_01_2509.pdf
https://www.ieee802.org/3/dj/public/25_09/kota_3dj_01_2509.pdf

A directional straw poll O1:
For the LR1 reference equalizer taps, I would support:
A: 31
B: 16
C: Abstain

A: 6 B: 6 C: 11

A directional straw poll (Chicago rules) O2:
For the LR1 reference equalizer taps, I would support:
A: 31
B: 23
C: 16
D: Abstain

A: 10 B: 12 C: 3 D: 9

A directional straw poll (Pick one) O3:
For the LR1 reference equalizer taps, I would support:
A: 31
B: 23
C: 16
D: Abstain

A: 7 B: 5 C: 3 D: 5

A decision straw poll (Pick one) O4:
For the LR1 reference equalizer taps, I would support:
A: 31
B: 23
C: Abstain

A: 12 B: 4 C: 6

After CRG discussion, implement slides 22-24 of
https://www.ieee802.org/3/dj/public/25_09/issenhuth_3dj_01a_2509.pdf
with editorial license.

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*Cl* **185** *SC* **185.12.4.1** *P* **614** *L* **32** # 288

Huber, Thomas — Nokia

*Comment Type* **ER** *Comment Status* **A** *(bucket) (O)*

Item F1 refers to an 800GBASE-LR1 PCS and PMA, but there are no such sublayers. Since LR1 requires an inner FEC it should be included in the PICS.

*SuggestedRemedy*

Change the feature column of item F1 to say "Compatible with 800GBASE-R PCS and PMA and 800GBASE-LR1 Inner FEC"

*Response* *Response Status* **W**

ACCEPT.

---

*Cl* **185A** *SC* **185A** *P* **910** *L* **4** # 126

Zimmerman, George — ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **TR** *Comment Status* **A** *shall statements (O)*

Annex 185A is considered normative, but in the entire clause I cannot find a single requirement statement ("shall" does NOT appear). As such, the entire clause is currently tutorial. Curiously there is a "may" which would normally be considered "is permitted", but that is meaningless in the absence of even a basic requirement. Without identifying requirements, it is impossible for the user of the methodologies to determine what is required and what is simply tutorial. I had considered a remedy of something like, ETCC shall be computed according to the method in steps... but there is too much. I have, in other comments attempted to identify some requirements - however, I suspect the experts defining this method may have more. As a result, while I have offered some possible requirements below, I have not marked those as required comments.

*SuggestedRemedy*

Identify the subset of statements in Annex 185A that are mandatory requirements and list them with shall statements, or, alternatively, label Annex 185A as informative.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

In 185A.2 change the last sentence from

"The ETCC parameter is defined in this annex"
To
"The ETCC parameter shall be calculated using the method described in this annex."

---

*Cl* **185A** *SC* **185A.2.3** *P* **913** *L* **15** # 178

El-Chayeb, Ahmad — Keysight Technologies (ahmad.el-chayeb@keysight.c

*Comment Type* **TR** *Comment Status* **A** *Reference equalizer (O)*

Reference equalizer and reference post-equalizer are missing to specify the respective number of taps.

*SuggestedRemedy*

Add definition tables for the number of taps for both the reference equalizer and the reference post-equalizer.
The actual numbers should then be specified respectively in sub-clauses 185.9 for LR1 and 187.9 for ER1 and ER1-20 as suggested in
https://www.ieee802.org/3/dj/public/25_07/kota_3dj_01a_2507.pdf

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #438
[Editor's note: changed page/line from 863/12]

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*Cl* **185A** *SC* **185A.2.3** *P* **913** *L* **17** # 437

Kota, Kishore — Marvell Semiconductor

*Comment Type* **T** *Comment Status* **A** *Reference equalizer (O)*

The section which describes the offline digital signal processing needs to define the number of taps to be used in the "reference equalizer" and the "reference post-equalizer" blocks as parameters for the ETCC calculation.

*SuggestedRemedy*

Add a table defining key parameters for the digital signal processing used for ETCC calculation. Propose adding the number of taps in "Reference Equalizer" and "Reference Post-Equalizer" as parameters in this table. The values for these parameters will be defined by the PMD clauses which reference this Annex based on the requirements of the specific PMD clause.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #438

*Cl* **185A** *SC* **185A.2.3** *P* **913** *L* **24** # 127

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **T** *Comment Status* **A** *shall statements (O)*

It appears that the block size (N=1000) is a requirement, and it isn't just the series of steps listed in 185A.2.3.1 through 185A.2.3.8, but also a number of other required parameters. (note - this is an attempt to find the key parameters, per my previous, required comment)

*SuggestedRemedy*

Change "The processing is done block wise with block size N = 1000 in a series of steps described in 185A.2.3.1 through 185A.2.3.8." to "The processing is shall be done block wise with block size N = 1000 according to the series of steps and parameters described in 185A.2.3.1 through 185A.2.3.8."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #126.

*Cl* **185A** *SC* **185A.2.3.5** *P* **914** *L* **19** # 337

Williams, Tom Cisco

*Comment Type* **TR** *Comment Status* **A** *Reference equalizer (O)*

Reference equalizer misses to specify the number of taps.

A supporting presentation will be provided

*SuggestedRemedy*

Add a specified number of taps to the description.

Propose a 31 tap equalizer.

"... with an adaptive 31 tap T-spaced feed-forward equalizer ..."

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #438

*Cl* **185A** *SC* **185A.2.3.7** *P* **914** *L* **29** # 338

Williams, Tom Cisco

*Comment Type* **TR** *Comment Status* **A** *Reference equalizer (O)*

The purpose of ETCC is to quantify the penalty due to transmitter-only impairments. The addition of the reference post equalizer in D2.1 is proposed to compensate for a transmitter-caused penalty (IQ skew) which allows poorer transmitters to pass the test and pushing the burden to the link receiver to compensate.

It is unclear if this reference post equalizer should remain in the specification.

However, to limit the burden to the link receiver, propose to limit the Reference Post equalizer to 5 taps and only in the through paths which is sufficient to address the skew. And a seperate 1-tap phase error correction.

A supporting presentation will be provided

*SuggestedRemedy*

Rewrite 185A.2.3.7 to:
A reference post-equalizer for each polarization is placed after the carrier phase recovery, and used to compensate for transmit I-Q skew and transmit I-Q phase error impairments.

The I-Q phase error is corrected via a 1-tap adaptive feed forward crosstalk cancellation between I-Q pairs.

The I-Q skew is corrected via four independent 5-tap adaptive T-spaced feed forward filters for each of the XI, XQ, YI, YQ signals, where T is the symbol period.

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.

Align with the response to comment #438.

Cl **185A** SC **185A.2.4.1** P**914** L**46** # 128

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **T** *Comment Status* **A** *shall statements (O)*

The text refers to IEEE Standard 1241-2023 for measuring ENOB, and then states in the next sentence, "Here, the ENOB is calculated from at least 10 measurements". I suspect that "Here" refers to "For the purposes of ETCC" but cannot be sure if it doesn't refer to something in IEEE 1241-2023. If I am right, using at least 10 measurements is another requirement. Further, the paragraph makes it clear that the 10 measurements are averaged.

*SuggestedRemedy*

Change "Here, the ENOB is calculated from at least 10 measurements" to "For the purposes of computing the ETCC, the ENOB shall be calculated from the average of at least 10 measurements"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 185A.2.4.1 change

"Here, the ENOB is calculated from at least 10 measurements with sine waves at frequencies that are spaced equally across the specified 3-dB bandwidth as per Table 185A-1 and with an amplitude corresponding to 90% utilization of the full-scale of the ADC. The final ENOB number is computed from linearly averaging the noise and distortion terms and then computing ENOB of that average according to IEEE Std 1241-2023."

Note: the last sentence was changed to the wording above via closed bucket comment #129.

To

"For the purpose of characterizing the ADC of the reference receiver used for ETCC, the ENOB shall be calculated from the average of at least 10 measurements with sine waves at frequencies that are spaced equally across the specified 3-dB bandwidth as per Table 185A-1, respectively and with an amplitude corresponding to 90% utilization of the full-scale of the ADC."

Cl **185A** SC **185A.2.4.1** P**914** L**50** # 129

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **TR** *Comment Status* **A** *(bucket) ENOB (O)*

while the final ENOB number is the average of "the individual points" - what are the points being averaged - are they "effective bits", are they "SNR" in dB (both log scales, so this is a geometric mean), or are they a linear average of signal power and noise power from which effective bits is then computed (more accurate). The text doesn't say. I have an old version of IEEE Std 1241 (2011), but I believe you want to average the NAD term, according to equation 67 there (COherent sampling test method for SINAD in the frequency domain).

*SuggestedRemedy*

Change "The final ENOB number is then the average of the individual points." to "The final ENOB number is computed from the linearly averaging the noise and distortion terms and then computing ENOB of that average according to IEEE Std 1241-2023."

*Response* *Response Status* **W**

ACCEPT IN PRINCIPLE.
In 185A.2.4.1 replace "The final ENOB number is then the average of the individual points." with "The final ENOB number is computed from linearly averaging the noise and distortion terms and then computing ENOB of that average according to IEEE Std 1241-2023."

Cl **185A** SC **185A.2.5** P**916** L**2** # 296

Huber, Thomas Nokia

*Comment Type* **ER** *Comment Status* **A** *(bucket) (O)*

The text here was not updated to reflect the change in modeling of 800GBASE-ER1 as a FEC sublayer rather than a standalone PCS.

*SuggestedRemedy*

Change ". the input to the PCS for 800GBASE-ER1 and 800GBASE-ER1-20." to ". the input to the ER1 FEC for 800GBASE-ER1 and 800GBASE-ER1-20."

*Response* *Response Status* **W**

ACCEPT.

*Cl* **185A** *SC* **185A.2.5.3** *P* **917** *L* **35** # 130

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **T** *Comment Status* **R** *(bucket) shall statements (O)*

I think this is the key requirement for ETCC - the stepwise calculation. Unfortunately, you can't actually specify the steps - that's a requirement on the user - but you can specify the steps or their equivalent.

*SuggestedRemedy*

Replace "ETCC is calculated using the following steps." with "ETCC shall be calculated using the following steps, or methods which produce the same result."

*Response* *Response Status* **C**

REJECT.
The normative statement is in clauses 185 and 187 that use the annex. In both clauses the parameter definition is "The ETCC shall be within the limit given in Table 185-5 if measured using the methods specified in 185.9" where 185.9 points to the annex and provides the specific parameter values to use the annex.
To meet ETCC requirement the value must be measured per the steps in the annex, adding "or methods which produce the same result" removes this requirement.

*Cl* **186** *SC* **186,2,1** *P* **619** *L* **4** # 406

Ran, Adee Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

The service interface in Figure 186-3 does not include an IS_SIGNAL.request primitive, although the PCS and PMA above the FEC can generate this primitive to the service interface below them.
This primitive is required if ILT is to be included; until then, it can be included with a statement that it has no effect.

*SuggestedRemedy*

Add a FEC:IS_SIGNAL.request primitive in Figure 186-3 and add text as necessary in 186.2.2 (examples can be taken from clause 177).
Implement with editorial license.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **186** *SC* **186.1.2** *P* **617** *L* **31** # 408

Ran, Adee Cisco Systems

*Comment Type* **T** *Comment Status* **R** *(bucket) (L)*

Figure 186-1 shows the FEC sublayer directly below the PCS. However, Figure 186-2 and Figure 186-3 indicate that the sublayer above can also be a PMA (two specific types). While theoretically the PCS can be connected directly, as in Figure 186-1, it is likely not the implementation most people have in mind.

*SuggestedRemedy*

Figure 186-1 add a box for the PMA, with a footnote that it is optional and limited to the 800GBASE-R 8:32 PMA or 800GBASE-R 4:32 PMA (to match Figure 186-2).

*Response* *Response Status* **C**

REJECT.

The only time a PMA is above the Inner FEC is when an AUI C2M is present. That will probably be the case for most implementations of 800GBASE-ER1 and 800GBASE-ER1-20. But it's the same case for all implementations of IMDD PHYs, and we have historically not included AUIs in these introductory figures. This figure is consistent with similar PHY types defined in the base standard.

*Cl* **186** *SC* **186.2.1** *P* **618** *L* **48** # 409

Ran, Adee Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

The 800GBASE-ER1 FEC sublayer should have a way to relay the "RTS" status from the PCS/PMA above it to the link partner and vice versa. This could be achieved by enabling/disabling the coherent transmitter output, but alternative methods that keep the transmitter active may be preferable.

*SuggestedRemedy*

A presentation with a detailed proposal will be provided.

*Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **186** *SC* **186.2.1** *P* **619** *L* **30** # 289

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

The location of the test pattern insertion points should be shown in the overview figure

*SuggestedRemedy*

Add an arrow indicating PRBS31 insertion occurs above the GMP mapping function.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Modify figure 186-3 as proposed.

*Cl* **186** *SC* **186.2.1** *P* **620** *L* **8** # 192

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

The indicated rate is nominal. See page 620 line 53.

*SuggestedRemedy*

Change: "a rate of 26.5625 Gb/s." To: "a nominal rate of 26.5625 Gb/s."

*Response* *Response Status* **W**

ACCEPT.

*Cl* **186** *SC* **186.2.2** *P* **621** *L* **6** # 193

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

According to Figure 186-3, FEC:IS_SIGNAL.indication is also influences by PMA:IS_SIGNAL.indication from the PMA.

*SuggestedRemedy*

Change: "The SIGNAL_OK parameter is set to OK when fec_all_mfas_locked (see 186.4.2.1) is true and is set to FAIL when fec_all_mfas_locked is false."
To: "The SIGNAL_OK parameter is set to OK when fec_all_mfas_locked (see 186.4.2.1) is true and the PMA:IS_SIGNAL.indication(SIGNAL_OK) is set to OK, and is set to FAIL otherwise."

*Response* *Response Status* **W**

ACCEPT.

*Cl* **186** *SC* **186.2.3.5.9** *P* **626** *L* **52** # 290

Huber, Thomas — Nokia

*Comment Type* **TR** *Comment Status* **A** *(bucket) (L)*

The sum of C(sub)nD is encoded in bits D1-D5 rather than D1-D7.

*SuggestedRemedy*

Change ".is encoded in bits D1-D7 of JC4 and JC5." to ".is encoded in bits D1-D5 of JC4 and JC5.

*Response* *Response Status* **W**

ACCEPT.

*Cl* **186** *SC* **186.2.3.5.10** *P* **627** *L* **7** # 497

Slavick, Jeff — Broadcom

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

First sentence is very long.

*SuggestedRemedy*

From:
The three bytes of the AML field are used to encode information about the location of 800GBASE-R PCS alignment markers that were removed by the Inverse RS-FEC transmit function (see 186.2.3.1) within the stream of 257-bit blocks that are mapped into the 800GBASE-ER1 tributary multi-frame payload area, such that the 800GBASE-R PCS alignment markers can be re-inserted in the same location by the 800GBASE-ER1 FEC sublayer receive function.

To:
The three bytes of the AML field encodes the location within the stream of 257-bit blocks that the 800GBASE-R PCS alignment markers were removed by the Inverse RS-FEC transmit function (see 186.2.3.1). The AML field is mapped into the 800GBASE-ER1 tributary multi-frame payload area so that the 800GBASE-R PCS alignment markers can be re-inserted in the same location by the 800GBASE-ER1 FEC sublayer receive function.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The first sentence is indeed too long and complex, but the suggested remedy is not accurately capturing the meaning.

Replace the first paragraph of 186.2.3.5.10 with this text:
"The three bytes of the AML field (row 3, octets 2 and 3, and row 4, octet 3) in each mult-frame form a single 24-bit field, as shown in FIgure 186-6. This field is used to encode information about the location of 800GBASE-R PCS alignment markers that were removed by the Inverse RS-FEC transmit function (see 186.2.3.1). The field encodes the position of the first non-stuff block that is mapped into the payload area relative to the location of the 800GBASE-R PCS alignment markers that were removed. This information allows the 800GBASE-R PCS alignment markers to be re-inserted in the same location by the 800GBASE-ER1 FEC sublayer receive function."

Implement with licence.

*Cl* **186** *SC* **186.2.3.12** *P* **631** *L* **33** # 291

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

The text regarding where the test pattern is inserted should be more clear.

*SuggestedRemedy*

Change ". is generated by the 800GBASE-ER1 FEC sublayer into each of the eight 800GBASE-ER1 tributary frames." to ". is generated by the 800GBASE-ER1 FEB sublayer into each of the eight 800GBASE-ER1 tributary frames, before the GMP mapping process (see Figure 186-3)..."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change ". is generated by the 800GBASE-ER1 FEC sublayer into each of the eight 800GBASE-ER1 tributary frames." to ". is generated by the 800GBASE-ER1 FEC sublayer into each of the eight 800GBASE-ER1 tributary frames, before the GMP mapping process (see Figure 186-3)..."

*Cl* **186** *SC* **186.4.2.1** *P* **648** *L* **40** # 97

Wienckowski, Natalie — IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The intent is that this variable is set to false when the next state is entered (in thia case, RAML_CNT_0 or RAML_CNT_INC), but the asssignmnet to false is missing.

Change the definition of the block_rx variable
From:
"Boolean variable that is set to true when the next non-stuff 257b block is demapped by the GMP demapper function."
To:
"Boolean variable that is set to true when the next non-stuff 257b block is demapped by the GMP demapper function. It is set to false upon entering the RAML_CNT_0 or RAML_CNT_INC states in the 800GBASE-ER1 FEC sublayer alignment marker location state diagram (see Figure 186-21)."

Update figure 186-21 to assign the value false to variable block_rx in states RAML_CNT_0 and RAML_CNT_INC.

Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **649** *L* **11** # 98

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to true or false. There is just a description of the use.

*SuggestedRemedy*

Change: Boolean variable that indicates that amp_counter has reached its terminal count.
To: Boolean variable that is set to true when amp_counter has reached its terminal count. Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In addition to not defining the true/false conditions, the text also refers to "amp_counter" rather than "fam_counter".

Change the definition of the variable fam_counter_done
From:
"A Boolean variable that indicates that amp_counter has reached its terminal count."
To:
"A Boolean variable that is set to true when the counter fam_counter has reached its terminal count. It is set to false when the counter is started (see figure 186-19).
Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **649** *L* **14** # 99

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to true or false. It just says it holds the output of the function FAM_COMPARE.

*SuggestedRemedy*

Add a description of when it is set to true and when it is set to false. There isn't enough information in the spec to provide a suggestion.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The variable fam_compare holds the result of the FAM_COMPARE function. The definition of the function indicates what it returns, and there is no value in repeating that information in the definition of the variable. The specification methodology is consistent with clause 119 and 172. However, in 186.4.2.2, the FAM_COMPARE function does not specify when it is set to false.

Add to the end of the defintion of function FAM_COMPARE in 186.4.2.2: ", otherwise it is set to false."

Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **649** *L* **14** # 104

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to true or false. It just says it holds the output of the function FAW_COMPARE.

*SuggestedRemedy*

Add a description of when it is set to true and when it is set to false. There isn't enough information in the spec to provide a suggestion.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The variable faw_match holds the result of the FAW_COMPARE function. The definition of the function indicates what it returns, and there is no value in repeating that information in the definition of the variable. The specification methodology is consistent with clause 119 and 172. However, in 186.4.2.2, the FAW_COMPARE function does not specify when it is set to false.

Add to the end of the defintion of function FAW_COMPARE in 186.4.2.2: ", otherwise it is set to false."

Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **649** *L* **18** # 100

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable fam_slip_done
From:
"A Boolean variable that is set to true when the FAM_SLIP requested by the FAM field lock state diagram has been completed and the next candidate 480-bit block position is available to be tested."
To:
"A Boolean variable that indicates the next candidate 480-bit block position is available to be tested. Is it set to true when the FAM_SLIP function completes and is set to false upon entering the GET_BLOCK state of the 800GBASE-ER1 FEC sublayer FAM field lock state diagram (see Figure 186-19).""

Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **649** *L* **23** # 101

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy to update the fam_valid definition with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **649** *L* **28** # 102

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the definition of the variable fam_lock<x>
From:
"A Boolean variable that is set to true when the receiver has detected the location of the FAM field among the stream of 257-bit blocks on an 800GBASE-ER1 FEC sublayer tributary FEC flow, where x = 0 to 7."
To:
"A Boolean variable that indicates the receiver has detected the location of the FAM field among the stream of 257-bit blocks on an 800GBASE-ER1 FEC sublayer tributary FEC flow,
where x = 0 to 7. The value of fam_lock<x> is set by the 800GBASE-ER1 FEC sublayer FAM field lock state diagram (see Figure 186-19)."
Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **649** *L* **30** # 103

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to true or false. There is just a description of the use.

*SuggestedRemedy*

Change: Boolean variable that indicates that faw_counter has reached its terminal count.
To: Boolean variable that is set to true when faw_counter has reached its terminal count. Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable faw_counter_done
From:
"A Boolean variable that indicates that faw_counter has reached its terminal count."
To:
"A Boolean variable that is set to true when the counter faw_counter has reached its terminal count. It is set to false when the counter is started (see figure 186-17).
Implement with editorial license.

[Editor's note: changed line from 11]

*Cl* **186** *SC* **186.4.2.1** *P* **649** *L* **45** # 105

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy to update the faw_valid definition with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **649** *L* **50** # 106

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable faws_lock<x>
From:
"A Boolean variable that is set to true when the receiver has detected the location of the FAW field for a given polarization symbol stream on the 800GBASE-ER1 PMD service interface, where x = 0:1."
To:
"A Boolean variable that indicates the receiver has detected the location of the FAW field for a given polarization symbol stream on the 800GBASE-ER1 PMD service interface, where x = 0 or 1. The value of faws_lock<x> is set by the 800GBASE-ER1 PMA FAW field lock state diagram (see Figure 186-17)."

Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **650** *L* **25** # 107

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable mfas_lock<x>
From:
"A Boolean variable that is set to true when the receiver has detected a valid MFAS sequence on an 800GBASE-ER1 FEC sublayer tributary FEC flow, where x = 0 to 7."
To:
"A Boolean variable that indicates the receiver has detected a valid MFAS sequence on an 800GBASE-ER1 FEC sublayer tributary FEC flow, where x = 0 to 7. The value of mfas_lock<x> is set by the 800GBASE-ER1 FEC sublayer multi-frame alignment state diagram (see FIgure 186-20)."

Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **650** *L* **29** # 108

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy to update the mfas_valid definition with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **650** *L* **40** # 109

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable fec_restart_lock
From:
"A Boolean variable that is set by the FAM field lock process to reset the synchronization process. It is set to true when 5 consecutive FEC frame alignment mechanism patterns fail to match (5_BAD state) on a given 800GBASE-ER1 tributary FEC flow."
To:
"Boolean variable that is used to restart the FAM field lock process when 5 consecutive FEC frame alignment patterns fail to match on a given tributary FEC flow. The value of fec_restart_lock is set by the 800GBASE-ER1 FEC sublayer FAM field lock state diagram (see Figure 186-19)."
Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **650** *L* **45** # 110

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable fec_mfas_restart_lock
From:
"A Boolean variable that is set by the MFAS field lock process to reset the synchronization process. It is set to true when 5 consecutive MFAS values do not match the expected value (5_BAD state) on a given 800GBASE-ER1 FEC sublayer tributary FEC flow."
To:
"A Boolean variable that is used to restart the MFAS field lock process when 5 consecutive MFAS values do not match the expected value on a given FEC sublayer tributary FEC flow. The value of fec_mfas_restart_lock is set by the 800GBASE-ER1 FEC sublayer multi-frame alignment state diagram (see FIgure 186-20).

Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **651** *L* **26** # 111

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable pma_restart_lock
From:
"A Boolean variable that is set by the FAW field lock process to reset the synchronization process on 800GBASE-ER1 PMA polarization symbol streams. It is set to true when 15 consecutive frame alignment word sequences to match (15_BAD state) on a given 800GBASE-ER1 PMA polarization symbol stream."
To:
"A Boolean variable that is used to restart the FAW field lock process on both PMA polarization symbol streams when 15 consecutive frame alignment word sequences fail to match on either PMA polarization symbol stream. The value of pma_restart_lock is set by the 800GBASE-ER1 PMA FAW field lock state diagram (see Figure 186-17)."

Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **651** *L* **37** # 112

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the definition of the variable raml_align
From:
"Boolean variable that is set to true if the raml_counter needs to be aligned to a new value"
To:
"Boolean variable that indicates when the 800GBASE-R PCS alignment markers insertion location needs to be aligned to the received AML overhead. The value of raml_align is set by the 800GBASE-ER1 FEC sublayer alignment marker location state diagram (see Figure 186-21)."
Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **651** *L* **42** # 113

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **R** *(bucket) (L)*

This Boolean variable is never set to true or false. There is just a description of the use.

*SuggestedRemedy*

Change: Boolean variable that indicates if the received information in the AML field is valid..
To: Boolean variable that is set to true if the received information in the AML field is valid. Otherwise, this variable is set to false.

*Response* *Response Status* **C**

REJECT.
The variable raml_valid is set based on the results of the RAML_CHECK function. The definition of that function indicates how the variable is set.

*Cl* **186** *SC* **186.4.2.1** *P* **651** *L* **47** # 114

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Update the definition of reset_fec to keep it consistent with comment #74 - reset is a special case.
Modify the definition of the reset_fec variable by adding: ", and is false otherwise." to end of the last sentence.
Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **651** *L* **50** # 115

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Update the definition of reset_pma to keep it consistent with comment #74 - reset is a special case.
Modify the definition of the reset_pma variable by adding: ", and is false otherwise." to end of the last sentence.
Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **652** *L* **11** # 116

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The rx_local_degraded variable is not used (or set) in any state diagram and therefore does not belong in the state machine variable definitions list.

Delete the variable definition of rx_local_degraded.

Implement with editorial license.

*Cl* **186** *SC* **186.4.2.1** *P* **652** *L* **17** # 117

Wienckowski, Natalie IVN Solutions LLC

*Comment Type* **T** *Comment Status* **A** *(bucket) (L)*

This Boolean variable is never set to false.

*SuggestedRemedy*

Add at the end of the description: Otherwise, this variable is set to false.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The rx_rm_degraded variable is not used (or set) in any state diagram and therefore does not belong in the state machine variable definitions list.

Delete the variable definition of rx_rm_degraded.

Implement with editorial license.

*Cl* **186** *SC* **186.7.2** *P* **662** *L* **6** # 292

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(bucket) (L)*

The first 4 rows in the table are sharing registers with the clause 177 inner FEC, but they have different names than what is used in clause 177 and in clause 45

*SuggestedRemedy*

Change "FEC_erc1fec_..." to "FEC_..."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

*Cl* **187** *SC* **187.6.1** *P* **677** *L* **34** # 293

Huber, Thomas — Nokia

*Comment Type* **TR** *Comment Status* **A** *(bucket) (O)*

The ETCC row doesn't indicate min or max, which implies that the specified value of 2.5 is required. However, this is a maximum value.

*SuggestedRemedy*

Change the Description from "ETCC" to "ETCC (max)"

*Response* *Response Status* **W**

ACCEPT.

*Cl* **187** *SC* **187.8.1** *P* **681** *L* **37** # 294

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *Test pattern (O)*

"Valid 800GBASE-R signal" should be more clearly defined. Presumably the intended input to the ER1 FEC is the scrambled Idle test pattern that the PCS generates.

*SuggestedRemedy*

In the pattern description, change "Valid 800GBASE-R signal" to "800GBASE-R scrambled idle signal". Replace the 'defined in' column with a reference to 172.2.4.11.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #56.

*Cl* **187** *SC* **187.8.1** *P* **681** *L* **37** # 56

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *Test pattern (O)*

In Table 187-10 a pattern specifically for a scrambled idle signal is not provided. Also, for consistency with Clause 185 (as well as 180 through 183), test pattern 5 should be renumbered to pattern 8.

*SuggestedRemedy*

In Table 187-10, renumber pattern 5 to pattern 8.
In Table 187-11, change instances of "5" to "8".
In Table 187-10, add new pattern 5 with description "Scrambled idle test pattern encoded the 800GBASE-ER1 FEC sublayer FEC" with references 172.2.4 and 186.2.3.12.
In Table 187-11, wherever pattern 7 is listed, also list (new) pattern 5.

*Response* *Response Status* **W**

ACCEPT.

*Cl* **187** *SC* **187.8.6** *P* **682** *L* **45** # 439

Kota, Kishore — Marvell Semiconductor

*Comment Type* **T** *Comment Status* **A** *Reference equalizer (O)*

Specify values for the parameters required in the digital signal processing for ETCC.

*SuggestedRemedy*

Add a table specifying values for the number of taps to be used for "Reference Equalizer" and "Reference Post-Equalizer" blocks. Presentation to be provided with specific values.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #438

*Cl* **187** *SC* **187.12.4.1** *P* **689** *L* **32** # 295

Huber, Thomas — Nokia

*Comment Type* **ER** *Comment Status* **A** *(bucket) (O)*

Item F1 in the PICS refers to the 800GBASE-ER1 PCS. With the change to a FEC sublayer, this should refer to 800GBASE-R PCS, 800GBASE-ER1 FEC, and 800GBASE-ER1 PMA

*SuggestedRemedy*

Change the feature column of item F1 to say "Compatible with 800GBASE-R PCS, 800GBASE-ER1 FEC, and 800GBASE-ER1 PMA.

*Response* *Response Status* **W**

ACCEPT.